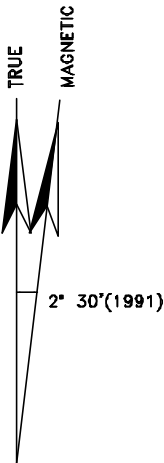


LEGEND

--- FENCE LINE

NOTES

- 1-GRID NORTH IS THE GEOGRAPHIC NORTH
2-ORIGIN OF THE GRID CO-ORDINATES
X=500KM IS THE 48° LONGITUDE
Y =0.00 IS THE EQUATOR



REV.		DESCRIPTION		DATE	APPD.
REVISION					
DRAWN		MAP		DATE	
CHK. BY				Feb 14 2004	
ENGR.					
ENGR. CHK.					
APPROVALS				VOICE OF AMERICA	
PROJ. MANAGER				ENGINEERING & TECHNICAL OPERATIONS	
SYSTEMS ENGR.				INTERNATIONAL BROADCASTING BUREAU	
				WASHINGTON, D.C. 20547	
				KUWAIT STATION	
				SITE PLAN	
FSCM NO.		DWG.		142-VT-001	
				C-01	

The figure is a topographic map of a coastal area, overlaid with a grid. The grid's vertical axis is labeled with Northing coordinates: N 3266190, N 3266250, N 3266310, N 3266370, N 3266430, and N 3266490. The horizontal axis is labeled with Easting coordinates: E 468250, E 468310, E 468370, E 468430, E 468490, E 468550, and E 468610. The map depicts a coastline with a road, a railway line, and various elevation points. A dashed line is labeled 'PROPOSED UTILITY LINE (POWER SUPPLY LINE + WATER SUPPLY LINE)'. A small structure is labeled 'ANTENNA'.

[illegible]

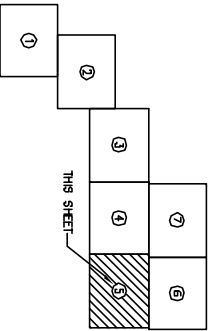
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E 468910					
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E 469030					
E 469090					
E 469150					
E 469210					
E 469270					

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NOTES

1. DRAINAGE AND ELEVATIONS ARE RELATIVE TO DATUM BM45.
2. IN REFERENCE TO THE ROUTING OF UNDERGROUND PIPES AND CABLES, A NOTE ON THE SITE HAS BEEN UNDERGROUND LINES HAVE BEEN LOCATED AT THE SURFACE OF THE SITE. THE LOCATION OF THESE LINES IS INDICATED BY A DASHED LINE WITH AN 'X' MARK. THE LOCATION OF THESE LINES IS INDICATED BY A DASHED LINE WITH AN 'X' MARK.
3. ALL THE MEASUREMENTS ARE IN METERS, UNLESS OTHERWISE SPECIFIED.
4. UNDERGROUND PIPES ARE LOCATED BY USING AN ELECTRIC METHOD WITH A 10mm TOLERANCE IN MEASUREMENT OF LEVEL.

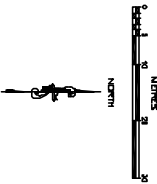
SHEET LAYOUT



LEGEND

- FENCE
- ===== CONCRETE
- ===== SECURITY BARRIER
- PIPE LINE 4"/S
- PROPOSED UTILITY LINES
- ROAD CENTER LINE
- SITE BOUNDARY LINE
- SINKLE GATE
- ⊙ BOREHOLE LOCATION
- ⊙ STEEL PN
- ⊙ SPOT LEVEL
- ▲ SURVEY CONTROL STATION
- TOP OF SLOPE
- BOTTOM OF SLOPE
- MAJOR CONTOUR LINES
- MINOR CONTOUR LINES

SCALE & ORIENTATION



Drawn by: [Name] Date: [Date] Checked by: [Name] Date: [Date] Approved by: [Name] Date: [Date]

INCO-LAB
International
BROADCASTING BUREAU (BBB)

FOR THE BROADCASTING BUREAU OF THE INTERNATIONAL BROADCASTING BUREAU (BBB)
FOR THE BROADCASTING BUREAU OF THE INTERNATIONAL BROADCASTING BUREAU (BBB)

Client: INTERNATIONAL BROADCASTING BUREAU (BBB)

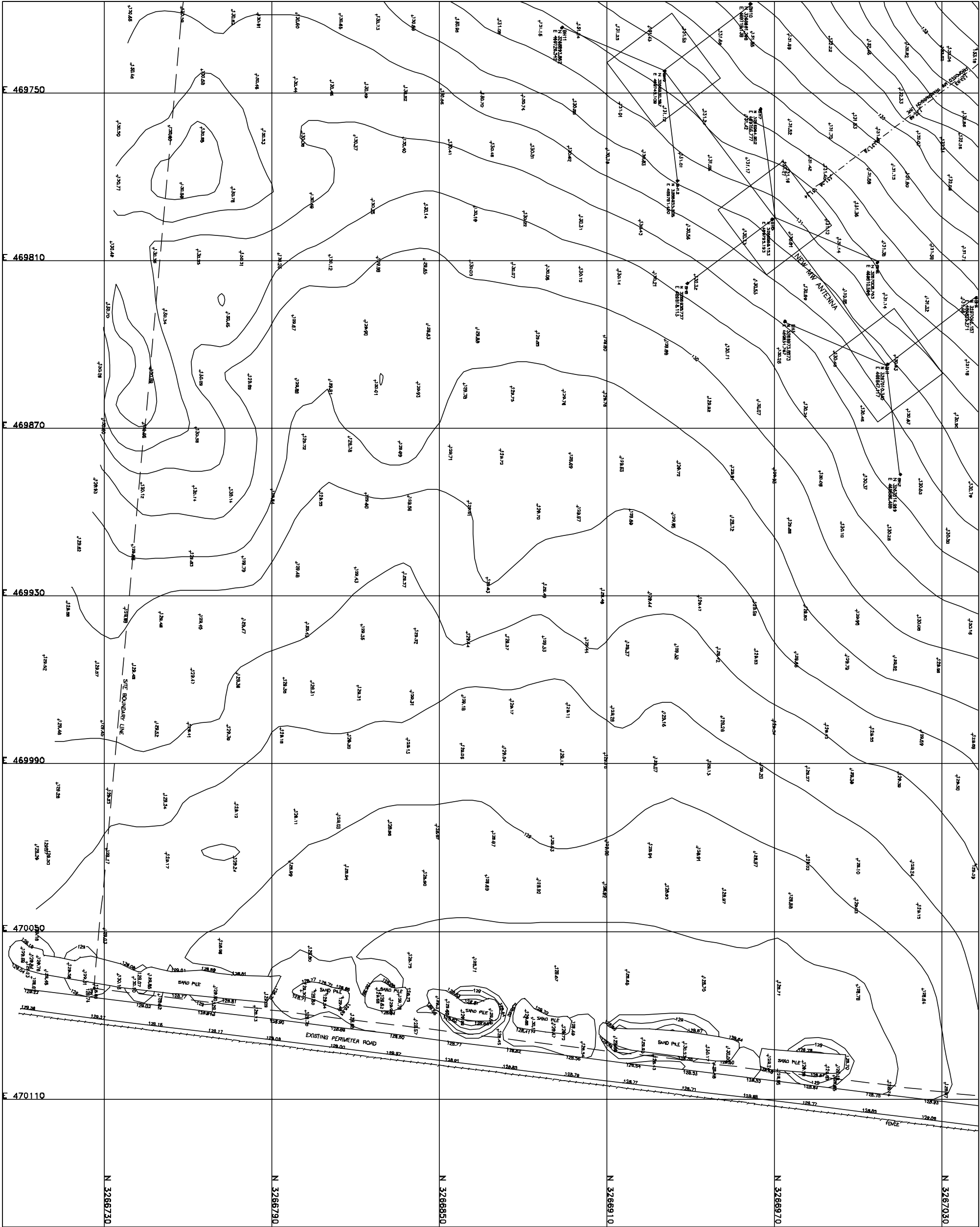
Project Title: BROADCASTING BUREAU (BBB)

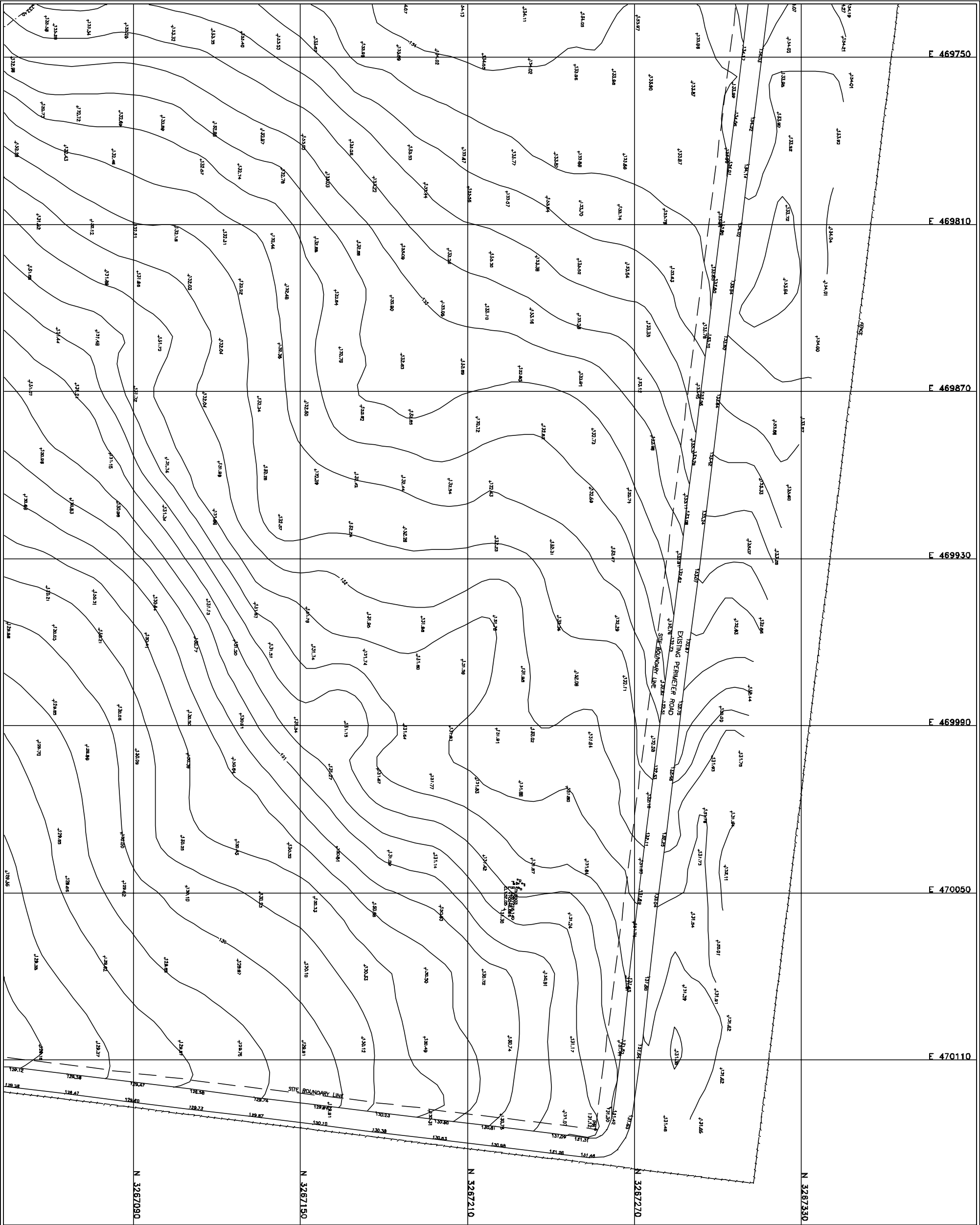
NEW PROJECT AT NORTH KUWAIT

Drawing Title:

TOPOGRAPHIC SURVEY

Location	Scale	Sheet No.	Scale	Sheet No.
KUWAIT	7248	5047	1:800	0





NOTES

1. CONTINGENT AND EQUIPMENT ARE SUBJECT TO EXISTING MAPS.

2. IN REFERENCE TO THE EXISTING OF LANDSCAPE ARCHITECTURE AND CHARTS.

3. A SHEET OF THE SITE HAS BEEN SUBMITTED, USING RADIO DETECTION EQUIPMENT, RESULTS OF THIS EQUIPMENT CANNOT ALWAYS BE QUANTIFIED, ESPECIALLY AT SPOTS WHERE THERE IS NO DOCUMENTED AREA.

4. THE EXISTING PERMETER ROAD IS NOT A SERVICE ROAD AND NOT AT THE LOCATION, ONLY THAT THE EQUIPMENT USED WAS UNABLE TO ENTER IT WITHIN THE LIMITS OF ITS RESPONSIBILITY.

5. ALL THE DIMENSIONS ARE IN METERS, UNLESS OTHERWISE SPECIFIED.

6. THE EXISTING PERMETER ROAD IS NOT A SERVICE ROAD AND NOT AT THE LOCATION, ONLY THAT THE EQUIPMENT USED WAS UNABLE TO ENTER IT WITHIN THE LIMITS OF ITS RESPONSIBILITY.

SHEET LAYOUT

THIS SHEET

①

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③

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⑥

⑦

LEGEND

----- FENCE

----- CONCRETE

----- SECURITY BARRIER

----- PPE LINE A/G

----- PROPOSED UTILITY LINES

----- ROAD CENTER LINE

----- SITE BOUNDARY LINE

----- SINGLE GATE

BOREHOLE LOCATION

STEEL PIN

SPOT LEVEL

▲ SURVEY CONTROL STATION

TOP OF SLOPE

BOTTOM OF SLOPE

MAJOR CONTOUR LINES

MINOR CONTOUR LINES

SCALE & ORIENTATION

SCALE 1 : 500

0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260 270 280 290 300 310 320 330 340 350 360 370 380 390 400 410 420 430 440 450 460 470 480 490 500 510 520 530 540 550 560 570 580 590 600 610 620 630 640 650 660 670 680 690 700 710 720 730 740 750 760 770 780 790 800 810 820 830 840 850 860 870 880 890 900 910 920 930 940 950 960 970 980 990 1000 1010 1020 1030 1040 1050 1060 1070 1080 1090 1100 1110 1120 1130 1140 1150 1160 1170 1180 1190 1200 1210 1220 1230 1240 1250 1260 1270 1280 1290 1300 1310 1320 1330 1340 1350 1360 1370 1380 1390 1400 1410 1420 1430 1440 1450 1460 1470 1480 1490 1500 1510 1520 1530 1540 1550 1560 1570 1580 1590 1600 1610 1620 1630 1640 1650 1660 1670 1680 1690 1700 1710 1720 1730 1740 1750 1760 1770 1780 1790 1800 1810 1820 1830 1840 1850 1860 1870 1880 1890 1900 1910 1920 1930 1940 1950 1960 1970 1980 1990 2000 2010 2020 2030 2040 2050 2060 2070 2080 2090 2100 2110 2120 2130 2140 2150 2160 2170 2180 2190 2200 2210 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Date: June 13, 2007

Ref.: INCO/P/MP/RPT/024-07

**INTERNATIONAL BROADCASTING BUREAU,
Kuwait Transmitting Station**
State of Kuwait.

Attention: **Mr. Gaines Johnson**
Station Manager

Job Order No.: 3652

Subject: Geotechnical Investigation Final Report
For the New MW Project
At IBB Kuwait Transmitting Station, Al-Mutla'a Area, Kuwait
Owner: International Broadcasting Bureau
=====

Dear Sir,

We are pleased to submit herewith eight (8) copies of the final Geotechnical Investigation report for the above mentioned project. This report has been prepared in accordance with our proposal dated 26th March 2007 (Ref. No. INCO/P/QUO/084-07) and as per your Purchase Order dated 11th April 2007 (Purchase Order No. BB-6445-64-07-P-002).

It was a pleasure to have worked with you on this project. We look forward to be of service again in your other future projects.

We trust that this report will meet your design requirements. Should you have any questions regarding this report, please do not hesitate to contact us.

Best Regards,
INCO - LAB

Dr. Abdul Majeed A. Jeragh
Technical Consultant

Encl: as above

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CHART

- 1** Terzaghi & Peck (1948 & 1967) Chart for Isolated Footings of 1.5m, 2.0m and 3.0m widths and maximum settlement of 25mm (1") constructed at different depths below the existing ground level (EGL).

TABLES

- 1.1 to 1.8** Net Allowable Bearing Capacity Values for isolated footings of 1.5 m, 2.0 m and 3.0 m widths and maximum settlement of 25mm (1") constructed at different depths below the existing ground levels

APPENDICES

- A** Field Activities
- B** Laboratory Testing
- C** Borehole Location Plan and Soil Profile

Geotechnical Investigation Final Report
For the
New MW Project
At IBB Transmitting Station, Kuwait
=====

1. INTRODUCTION

This report presents the results of the subsurface soil exploration carried out on 19th to 22nd April 2007 and on 29th April to 5th May 2007 for **M/s. International Broadcasting Bureau** in connection with the New MW Project at IBB Kuwait Transmitting Station in Al-Mutla'a area, Kuwait.

The project consists of the proposed construction of a new 3000 sq.ft Single Storey Transmitting Building, three (3) 56m new antenna towers, new utilities and transmission lines, parking area, fencing around the new site and an access road to connect the new site to the existing perimeter road. The locations of the boreholes that explored the project site are shown in the boreholes location plan in the attached Appendix C.

This report presents the results of the completed subsurface soil exploration. Recommendations on subsoil parameters, bearing capacities and other related geotechnical parameters are also provided to aid in the design of the foundations of the proposed structures for the project.

All works for the subsurface soil exploration were carried out in accordance with applicable ASTM (American Society for Testing and Materials) Standards, BSI (British Standards Institute) and other acceptable Geotechnical Standards/Guidelines. A brief description of the methodology of the field and laboratory tests are likewise provided in this report.

2. LOCAL CONDITION AND REGIONAL GEOLOGY

2.1 Natural Setting and Climate

The State of Kuwait is situated at the northeastern corner of the Arabian Peninsula. It comprises an area of approximately 17,800 km² extending between latitudes 28°30' and 30°05'N and longitudes 46°33' and 48°30'E.

Kuwait is characterized by the predominance of a hot and dry climate. The summer in Kuwait is very hot especially in July and August. The mean temperature during this period varies between 30°C and 50°C. Winter is rather cool especially in January with mean temperature 12°C.

Rainfall in Kuwait is scanty, totaling 110 mm per year. Another most prevailing climatological characteristic in Kuwait is the frequent dust-storm. The contribution of

dust sedimentation of northwestern part of the Arabian Gulf is found to be 1 mm per year. The same thickness of deposition is assumed to be taking place throughout the coastal areas of Kuwait.

Pronounced variations in humidity is another common climatological phenomenon in Kuwait. Relative humidity varies from 60.9% in January to 21.5% in June. On the other hand, evaporation is very high and is variable within location and seasons. The mean amount of evaporation is 10.3 mm per day.

2.2 Regional Geology

Kuwait lies on the eastern edge of the deep sedimentary basin that forms the Arabian Peninsula, and is underlain by a considerable thickness of sedimentary rocks. In the south of Kuwait, relatively young deposits of the Dibdibba formation (Upper Miocene to Pleistocene Epochs, approximately 2 to 10 million years old) outcrop at the surface. These deposits are underlain at depth by the Dammam formation (Upper Eocene Epoch, approximately 38 to 42 million years old). The normally intervening deposits of the fars formation are absent except in Northern Kuwait.

The Dibdibba formation typically consists of siliceous sands and gravels, with varying amounts of silt and some thin clay and gypsum bands. Cementation is only partial and relatively poor, consisting of calcium carbonate and gypsum.

In South Kuwait the recent deposits overlying the Dibdibba formation consists chiefly of the windblown sand forming sheets and low dune structures. Adjacent to the shoreline calcareous deposits are locally present generally consisting of oolitic and bioclastic sands.

The low seasonal rainfall mostly evaporates or percolates into the ground, therefore, little runoff ends to the sea. The influence of evaporation predominates, and the general movement of groundwater is upward. This leads to high concentrations of soluble material near the ground surface generally calcium carbonate, gypsum etc. In North Kuwait gypsum predominates, whereas in the South high concentration of calcium carbonates are encountered near the ground surface.

Ref :- J. Al-Sulaimi and A. Mukhopadhyay (2000). “**An Overview of the Surface and Near-surface Geology, Geomorphology and Natural Resources of Kuwait**”. Earth-Science Reviews 50 (2000).

3. SCOPE OF WORK

The scope of work carried out for the soil investigation is generally as detailed in our proposal and it can be summarized as follows:

3.1 Field Work

In order to provide the necessary data input for the soil investigation report, a field exploration program was carried out, which in summary consisted of the following:

- Three (3) boreholes were drilled to 10.0m depth each at the proposed locations of the Antenna Towers (one borehole each for each Antenna Tower base).
- Nine (9) boreholes were drilled to 6.0m depth each at the proposed locations of the guy anchors (three guy anchors for each Antenna Tower)
- Two (2) boreholes drilled down to 10.0m depth each at the proposed location of the new Transmitting Building.
- Nineteen (19) boreholes were drilled to 6.0m depth each along the proposed route of the Utilities.
- Two (2) Falling Head Tests were performed within the vicinity of the proposed area for the septic tank of the new Transmitting Building.
- Standard Penetration Tests (SPT) performed at 0.5m interval down to 3.0m depth, thereafter at 1.0m interval to the final depth.
- Disturbed samples for visual classification were taken from all the depths of the Standard Penetration Tests..
- Undisturbed samples using Dames and Moore sampler were taken at selected depth for laboratory testing.

All field operations were supervised and directed by Inco-Lab drilling supervisor. Detailed description of field activities and field test results are presented in Appendix A attached to this report.

Boreholes location plan and soil profiles are presented in Appendix C attached to this report.

3.2 Laboratory Testing

A laboratory-testing program was set up to aid classification and to evaluate the physical and engineering properties of the subsurface soils. The laboratory testing was performed according to the test methods as per BS or ASTM Standards. The laboratory test results and a brief description of the test methods are presented in Appendix B of this report.

4 SUBSURFACE CONDITIONS

4.1 Subsurface Soils

General subsurface soil profile encountered at the project site is briefly described hereunder. These descriptions are based on the soil classification tests and Standard Penetration Tests (SPT) performed during the field investigation and laboratory testing.

The subsurface soil at the site is composed of wind-blown-sand deposits in the upper layer. Below this, is a very dense formation of weak calcareous fine sandstone. This is

a soft rock lense which is weathered and degraded in place and becomes a very dense sand deposit. Intervening medium dense sand lenses were encountered at depths where the fine sandstone is highly weathered and poorly cemented.

The generalized soil profile along the influence boreholes that explored the various proposed structures are shown in the accompanying soil profile sheets in Appendix C.

4.1.1 Antenna Tower and Guy Anchor Locations.

The proposed site of the three (3) antenna towers and guy anchors were explored by boreholes BH-1 to BH-9 as shown in the attached boreholes location plan.

Antenna Tower No.1 and Guy Anchors. For this site, the borehole location of BH-9 is designated as the Antenna Tower No.1 base location and boreholes BH-10 to 12 for the guy anchor locations. In borehole BH-9, medium dense sand was encountered down to 1.5m depth. This has an average N value of 15 blows/30cm. The soil becomes very dense (Nvalues > 50) below 1.5m to the maximum borehole depths of 6.0m and 10.0m.

In borehole BH-10, the guy anchor at this location is underlain by very dense sand (Nvalues > 50) below EGL down to 6.0m depth. In boreholes BH-11 and BH-12, the the guy anchors at these location are underlain by a medium dense sand (average Nvalue=14) down to 3.0m depth. Thereafter, the soil becomes very dense (Nvalues > 50) down to 6.0m depth.

Antenna Tower No.2 and Guy Anchors. Borehole BH-5 explored the location of the tower base designated as Antenna Tower No.2 in this site. This borehole is underlain by medium dense sand down to 1.0m depth and at 2.0m to 3.0m depth. This has average Nvalue of 18. There is an intervening very dense layer at 1.0 to 2.0m depth. Below 3.0m depth, this soil becomes very dense (Nvalues >50) down to the 10m depth of the borehole.

The guy anchor locations were explored by BH-6, BH-7 and BH-8. Very dense sand formation was encountered from EGL at BH-7 down to 6.0m depth. In BH-6, this location is underlain by medium dense sand (Nvalue=22) down to 1.0m depth. Thereafter, the soil becomes very dense down to 6.0m depth with an interrupting medium dense lense (Nvalue=14) at 3.0m to 4.0m depth.

Antenna Tower No.3 and Guy Anchors. Borehole BH-1 for the designated Antenna Tower No.3, is underlain by very dense sand from EGL down to 6.0m depth.

However, there is an interrupting medium dense lense (Nvalue=11) at 2.0m to 3.0m depth.

For the guy anchor at BH-4, the soil is very dense from EGL down to 6.0m depth. In BH-2 and BH-3, the soil encountered consists of medium sand down to 1.0m and 3.0m depths, respectively. The Nvalues range from 10 to 16 with average Nvalue of 13. Below this layer, the soil becomes very dense down to the 6.0m depth of the boreholes.

4.1.2. New Transmitting Building Location

The New Transmitting Building was explored by BH-13 and BH-14. The proposed site is underlain by competent very dense foundation materials (Nvalue >50) at shallow depth down to 10m depth.

There is a medium dense sand layer (Nvalue=28) limited in BH-13 down to 1.0m depth.

4.1.3 Utilities Line

The proposed route for the utilities was explored by nineteen (19) shallow boreholes (6.0m depth) namely, BH-15 to 33. The boreholes were drilled at approximate interval of 100m.

The results of these boreholes indicate the presence of approximately 1.0m to 1.5m thick medium dense sand encountered in BH-15 to 16, in BH-24 to 26, in BH-29 and BH-33. There is a loose layer encountered in BH-30 but limited to 1.0m depth below EGL. Below these layers the soil is very dense to 6.0m depth.

In BH-17 to 23, 27, 28, 31 and 32, the soil is very dense from EGL down to 6.0m depth of boring.

The generalized soil profile along the proposed utilities route is as shown in sheets 5 to 6 of Appendix C attached to this report.

4.2 Groundwater

Water table was not encountered within the 6m and 10m depth of the boreholes. Thus, we do not see the need for any dewatering during the construction phase.

5. ENGINEERING PROPERTIES OF ON-SITE SOIL

A summary of the generalized subsurface soil parameters are presented in **Table A** below which are derived from the analysis of the penetration resistances, soil types encountered, laboratory test results and accumulated experience with similar types of soil.

Table A-1: Generalized Subsurface Profile Parameters-Utilities Line and New Transmitting Building

BH Nos.	Depth (m)	Dry Density (g/cm ³)	Angle of Internal Friction (degrees)	Cohesion (kPa)	Modulus of Deformation (MN/m ²)	Soil Types
1. Utilities Line						
BH-15,BH-16 BH-25,BH-26 BH-29,BH-33	0.5 to 1.0	1.672	31	0	19	SP-SM,
	1.0 to 6.0	1.813	38	0	38	SM,SP-SM,SC
BH-17,BH-19 BH-27,BH-28 BH-32	0.5 to 6.0	1.850	38	0	38	SP-SM,SM,SP,SC
BH-18,BH-20 BH-22	0.5 to 5.0	1.854	38	0	38	SP-SM,SM,SP-SC,SW
	5.0 to 6.0	1.704	30	0	17	SP-SM,SP
BH-21 BH-23	0.5 to 4.0	1.863	36	0	38	SM,SP-SM
	4.0 to 5.0	1.878	31	0	20	SP-SM,SP
	5.0 to 6.0	1.934	35	0	38	SM,SP-SM
BH-24	0.5 to 1.5	1.758	30	0	9	SP-SM
	1.5 to 6.0	1.917	38	0	38	SW,SM
BH-30	0.5 to 1.0	1.593	30	0	7	SP-SM
	1.0 to 6.0	1.659	37	0	38	SM,SP-SM
BH-31	0.5 to 5.0	1.668	38	0	38	SP-SM,SM,SC
	5.0 to 6.0	1.647	33	0	11	SP
2. New Transmitting Building						
BH-13	0.5-1.0	1.816	30	0	21	SP-SM
BH-14	1.0-10.0	1.816	33	0	38	SP-SM,SM,SP-SC,SP

The values of modulus of deformation are obtained from the correlated values of Young's modulus with SPT number (N) based on: Schmertmann (1970) equation $E_s \text{ (kN/m}^2\text{)} = 766N$

Table A-2: Generalized Subsurface Profile Parameters-Antenna Tower

BH Nos.	Depth (m)	Dry Density (g/cm ³)	Angle of Internal Friction (degrees)	Cohesion (kPa)	Modulus of Deformation (MN/m ²)	Soil Types
1. Antenna Tower–1 Base						
BH-9	0.5 to 1.5	1.742	32	0	11	SP-SM
	1.5 to 10.0	1.768	34	0	38	SM,SW,SP-SM
1.1 Antenna Tower–1 Guy Anchors						
BH-10	0.5 to 6.0	1.742	39	0	38	SP-SM,SP-SC
BH-11	0.5 to 3.0	1.851	32	0	10	SP-SM
	3.0 to 6.0	1.795	38	0	38	SP-SM,SM
BH-12	0.5 to 3.0	1.795	32	0	11	SP-SM
	3.0 to 6.0	1.677	38	0	38	SM,SP-SM
2. Antenna Tower–2 Base						
BH-5	0.5 to 1.0	1.761	31	0	15	SM
	1.0 to 2.0	1.801	39	0	38	SM,SP-SM
	2.0 to 3.0	1.761	31	0	14	SP-SM,SM
	3.0 to 10.0	1.801	41	0	38	SM,SP-SM
2.1 Antenna Tower–2 Guy Anchors						
BH-6	0.5 to 1.0	1.822	32	0	17	SP-SM
	1.0 to 3.0	1.679	36	0	38	SP-SM,SP
	3.0 to 4.0	1.679	32	0	11	SP
	4.0 to 6.0	1.679	36	0	38	SP-SM
BH-7	0.5 to 6.0	1.748	39	0	38	SP-SM, SM
BH-8	0.5 to 3.0	1.767	32	0	10	SP-SM
	3.0 to 6.0	1.801	41	0	38	SP-SM,SM
3. Antenna Tower–3 Base						
BH-1	0.5 to 2.0	1.746	37	0	38	SC,SP-SM
	2.0 to 3.0	1.812	32	0	8	SP-SM
	3.0 to 10.0	1.746	37	0	38	SM,SP-SM
3.1 Antenna Tower–3 Guy Anchors						
BH-2	0.5 to 1.0	1.662	34	0	12	SP-SM
	1.0 to 5.0	1.702	38	0	38	SP-SM
	5.0 to 6.0	1.662	34	0	21	SP-SM
BH-3	0.5 to 3.0	1.817	32	0	12	SP
	3.0 to 5.0	1.817	38	0	38	SM
	5.0 to 6.0	1.662	34	0	18	SP
BH-4	0.5 to 6.0	1.822	39	0	38	SM,SP-SM,SP

The values of modulus of deformation are obtained from the correlated values of Young's modulus with SPT number (N) based on: Schmertmann (1970) equation $E_s \text{ (kN/m}^2\text{)} = 766N$

6. FOUNDATION AND BEARING CAPACITY RECOMMENDATIONS

6.1 Bearing Capacity for Isolated Footings

Based on the results of the subsurface soil exploration, shallow isolated footings placed on very dense sand formation are recommended for foundation of the proposed structures. The underlying very dense sand is a competent foundation material which can be mobilized to support the foundations for the proposed New Transmitting Building and Antenna Towers.

The recommended bearing capacities and levels of the foundation for the New Transmitting Building and Antenna Towers are presented in *Table B* below. The bearing capacity values are evaluated by using Terzaghi & Peck (1948-1967) Chart for isolated footings for varying widths of 1.5m, 2.0m and 3.0m constructed at different depths below the existing ground level (EGL). The recommended bearing capacities are for maximum 25mm allowable settlement. The chart of Terzaghi and Peck (1948-1967) is attached to this report for reference.

Table B: Bearing Capacity Recommendations for the Site

Proposed Structure	Borehole Nos.	Depth of Foundation below EGL (m)	Allowable Net Bearing Capacity (Kg/cm ²)		
			Width of Foundation (m)		
			1.5	2.0	3.0
Single Storey New Transmitting Building	BH-13 & BH-14	1.5	3.0	3.0	3.0
		2.0 and below	3.0	3.0	3.0
Antenna Tower - 1	BH-9	2.0	3.0	3.0	3.0
		2.5 and below	3.0	3.0	3.0
Antenna Tower - 2	BH-5	2.0	1.7	1.5	1.4
		2.5	2.2	2.1	1.9
		3.0 and below	3.0	3.0	3.0
Antenna Tower - 3	BH-1	2.5	1.1	1.0	0.9
		3.0 and below	3.0	3.0	3.0

For the Antenna Towers, deep embedment of the foundations may be required for stability. This would be beneficial due to the presence of very dense sand materials at deeper level with higher bearing capacity.

It is to be ensured that no percolating pits, contaminated or loose soil exist below or near the proposed foundation.

To confirm the recommended allowable bearing pressure at the foundation level, it is recommended to carry out Plate Load Tests prior to the construction of foundation.

For reference of the bearing pressures at various depths in each borehole location (BH-1 to BH-33), the values are summarized in *Tables 1.1 to 1.8* of this report.

6.2 Coefficient of Active and Passive Pressures for Guy Anchors

The lateral loads resulting from wind, earth pressure, etc. are resisted by mobilization of friction between the guy anchor block and the supporting soil and passive pressure of the soil.

A coefficient of friction of 0.40 may be used for cast-in-situ concrete and the soil and a value of 0.25 may be used for pre-cast concrete and the soil.

The active and passive pressure coefficients for various depths are given above in Table C, below. The values given for dry density and angle of internal friction were evaluated from the results of direct shear tests from of borehole samples and correlation with the SPT N values. The results of the direct shear tests can be found in Tables B3.1 to B3.62 attached to this report.

Table C: Active & Passive Earth Pressure Coefficients

Proposed Structure	Borehole Nos.	Depth (m)	Dry Density (g/cm ³)	Angle of Internal Friction (degrees)	Coefficient of Active Pressure (Ka)	Coefficient of Passive Pressure (Kp)
Antenna Tower-1 Base	BH-9	0.5 to 1.5	1.742	32	0.307	3.254
		1.5 to 10.0	1.768	34	0.283	3.535
Guy Anchors	BH-10	0.5 to 6.0	1.742	39	0.227	4.395
		6.0 to 10.0	1.742	39	0.227	4.395
	BH-11	0.5 to 3.0	1.851	32	0.307	3.254
		3.0 to 6.0	1.795	38	0.238	4.208
	BH-12	0.5 to 3.0	1.795	32	0.307	3.254
		3.0 to 6.0	1.677	38	0.238	4.208
For Antenna Tower-2 Base	BH-5	0.5 to 1.0	1.761	31	0.320	3.124
		1.0 to 2.0	1.801	39	0.227	4.395
		2.0 to 3.0	1.761	31	0.320	3.124
		3.0 to 10.0	1.801	41	0.208	4.816
Guy Anchors	BH-6	0.5 to 1.0	1.822	32	0.307	3.254
		1.0 to 3.0	1.679	36	0.260	3.852
		3.0 to 4.0	1.679	32	0.307	3.254
		4.0 to 6.0	1.679	36	0.260	3.852
	BH-7	0.5 to 6.0	1.748	39	0.227	4.395
	BH-8	0.5 to 3.0	1.767	32	0.307	3.254
		3.0 to 6.0	1.801	41	0.208	4.816
	BH-8	6.0 to 10.0	1.801	41	0.208	4.816
For Antenna Tower-3 Base	BH-1	0.5 to 2.0	1.746	37	0.249	4.023
		2.0 to 3.0	1.812	32	0.307	3.254
		3.0 to 10.0	1.746	37	0.249	4.023
Guy Anchors	BH-2	0.5 to 1.0	1.662	34	0.283	3.535
		1.0 to 5.0	1.702	38	0.238	4.208
		5.0 to 6.0	1.662	34	0.283	3.535
	BH-3	0.5 to 3.0	1.817	32	0.307	3.254
		3.0 to 5.0	1.817	38	0.238	4.208
		5.0 to 6.0	1.662	34	0.283	3.535
	BH-4	0.5 to 6.0	1.822	39	0.227	4.395
		6.0 to 10.0	1.822	39	0.227	4.395

It is the designer's responsibility to check the stability of the structures.

7. **EARTHWORK RECOMMENDATIONS**

7.1 Excavation

The subsurface soil at the site is composed of very dense sand formation which are weathering byproducts of fine sandstone formation prevalent at the site. The presence of resistant rock lenses or bands of the weathered fine sandstone should be anticipated during the construction phase. The use of excavator equipped with demolition hammer should be considered.

7.2 Earthworks

In general terms, any granular soil with non-plastic fine content not exceeding 15% can be considered a suitable construction fill material. Soils with higher fines content and containing plastic fines may be difficult to compact as a result of swelling/softening when soaked with water.

Compaction is the cheapest and most widely used method to improve the soil properties. It may be accomplished by excavating some depth, then carefully back-filling in control lift thickness and compacting the soil with the appropriate compaction equipment. Fills should be placed using compaction control criteria.

Compaction of cohesionless (sand) soil can be accomplished using smooth wheel rollers commonly with a vibrating device inside, so the compaction is a combination of confinement, pressure and vibration. Lift depths up to about 0.5 m can be compacted with heavy equipment. In confined spaces, it is necessary to use powered hand-operated equipment for compacting the soil. In this case if density has been specified, the lift thickness should not exceed 75 to 100 mm. Compacting lifts which is too thick result in a dense upper crust overlaying un-compacted soil. This is true regardless of the type equipment used on the soil.

Backfill material should meet the requirements of the construction fill with limited percentage of fines and good compaction characteristics. The material used as fill under both rigid as well flexible pavements shall be clean, hard, durable sand, gravels or crushed stones and free from organic materials, clay balls or other deleterious substances. Its liquid limit and plastic index should not exceed the values of 25 and 6 respectively as determined by ASTM D-4318-84. The material shall be placed in layers not more than 20 cm thick and compacted to a density of not less than 95 % of the maximum dry density.

The tests listed below should be carried out on samples of on site soil taken from the full depth range of proposed excavations to determine their suitability as backfill material:

- Sieve Analysis
- Atterberg Limits Tests
- Chemical tests to determine sulphate, chloride, and organic matter content of soil
- Proctor tests
- CBR Tests
- Direct Shear box tests

The parameters determined from above tests should be compared with the values stated in the Backfill Material Requirement table given below to determine their suitability as backfill material.

Table D: Backfill Material Requirement

Sr.No.	Soil Properties	Minimum Requirements	Test Method
1	Soil Classification	A-1-a, A-1-b, A-2-4	AASHTO 145
2	Material Passing # 200	< 20 %	ASTM D 422
3	Max. Dry Density	$\geq 1.95 \text{ g/cm}^3$	ASTIM-1557
4	Liquid Limit	≤ 25	ASTM D 4318
5	Plastic Index	≤ 6	ASTM D 4318
6	Swelling	$\leq 1 \%$	ASTM D 1883
7	Soaked CBR Value	≥ 12	AASHTO T 193 ASTM D 1883

Prior to placing any fill the filling procedures outlined below should be followed:

- The surface should be scarified and moistened or aerated.
- Place and compact fill in equal contiguous layers not exceeding 200mm. Thickness.
- Employ a placement method that does not displace or damage other work.
- Maintain optimum moisture content of fill to attain required compaction density. It is recommended that Field Moisture Content should be within ($\pm 4 \%$ of O.M.C.).
- Water: Brackish water in addition to fresh water may be used if required for all earthwork operations. However, if brackish water is used, Sulphate and Chloride should be determined to compare with allowable limits.

Backfilling and making up levels shall be carried out in layers not exceeding thickness of 200 mm by compacting each layer using approved compacting plan to achieve minimum of 95 percentage of maximum dry density at optimum moisture content when tested in accordance with ASTM D 1557

Perform field density tests according to ASTM D 1556 on each layer as per Geotechnical Engineer's instruction.

To maintain stable slopes all slopes in loose to medium dense soil may be sloped at 1 : 2 (vertical : horizontal) and all slopes in dense to very dense soil may be sloped at 1: 1.5 (vertical: : horizontal) for natural soil. All slopes for field compacted soils may be sloped at 1:1.5 (vertical : horizontal) and should be constructed oversized and trimmed back to final gradient.

It is recommended that all site operations related to earthwork covering removal of unsuitable materials, field compaction test programs, re-grading and compaction, and construction of bunds, tank pads etc. should be carried out under supervision of an independent Geotechnical Engineer.

7.3 Slope Stability

In many cases, civil engineers are expected to make calculations to check the safety of natural slopes, slopes of excavations and compacted embankments. This check involves determining and comparing the shear stress developed along the most likely rupture surface with the shear strength of the soil.

The stability analysis of a slope is not an easy task, evaluation of variables such as the soil stratification and its in-place shear strength parameters may prove to be a formidable task. Seepage through the slope and the choice of a potential slip surface add to the complexity of the problem.

Generally, a value of 1.5 for the factor of safety with respect to strength is acceptable for the design of a stable slope.

Therefore, there are two approaches to the analysis of slope stability:

- 1) Stability of Infinite slopes with and without seepage.
- 2) Finite slopes stability.

1.1 The stability of infinite slope without seepage

When pore water pressure is zero,

Factor of safety,

$$FS = (c/\gamma H \cos^2 \beta \tan \phi) + (\tan \phi / \tan \beta) \geq 1.5$$

where,

ϕ = Angle of friction

C = Cohesion

γ = Unit weight of the soil

β = Angle of the slope with horizontal plane.

For granular soils, C =0, and factor of safety, becomes

$$FS = (\tan \phi / \tan \beta)$$

and the height H and the slope is stable as long as $\beta < \phi$

$$H_{cr} = (C / \gamma \cos^2 \beta (\tan \beta - \tan \phi))$$

H_{cr} is the critical height (FS=1) where the slope is in a state of impending failure

1.2 Stability of infinite slopes with seepage

For this case, the factor of safety with respect to the strength is

$$FS = (C / \gamma_{sat} H \cos^2 \beta \tan \phi) + (\gamma' \tan \phi / \gamma_{sat} \tan \beta)$$

$\gamma' = \text{dry unit weight } (\gamma_{\text{sat}} - \gamma_w).$

2. Finite Slopes:

When the value of H_{cr} approaches the height of the slope, the slope may generally be considered finite. The analysis of finite slopes with plane failure surfaces (Culmann's Method) gives the following:

$$C_d = (\gamma H/4)(1 - \cos(\beta - \phi_d)/\sin\beta \cos\phi_d) \\ \& \\ H_{\text{cr}} = (4c/\gamma)[(\sin\beta \cos\phi_d)/(1 - \cos(\beta - \phi_d))]$$

where,

C_d = Cohesion along the potential failure surface

ϕ_d = Angle of friction along failure plane

8. PERMEABILITY OF SUBSURFACE SOIL

In-situ permeability of the shallow subsurface soil within the vicinity of the Transmitting Building was determined by Falling Head Method. Two (2) locations were tested near borehole BH-13. The test locations are approximately 3m from the edge of the proposed building footprint as shown in the attached Boreholes Location Plan.

The test aims to determine the permeability of near-surface soil layers for possible siting of the septic vault for the building. Each location was tested at two (2) different depths namely, at 1.5m and 3.0m in FHT-1 and at 2.0m and 4.5m in FHT-2.

The test hole was drilled by augering to the required testing level. Upon reaching the test depth, an HW casing (4.5" diameter O.D.) was lowered in order to case the hole leaving a 0.5m uncased portion at the bottom of the hole.

The HW casing was then filled with water. Readings were made to monitor the fall of water level inside the casing at time intervals of 10 sec, 20 sec, 30 sec, 1 min, 2 min, 5 min, 10 min, 20 min and 30 min to a 2 hour period. The results are presented in the attached Plates A5.1 to A5.4.

The formula for determination of permeability from seepage tests NAVFAC D.M. & 1 (Sept. 1986) was used in estimating the coefficient of permeability (k). The average coefficient of permeability (k) at different depths based on the falling head tests are as follows:

Table E. Field Permeability Test Results

Test Location	Depth below EGL (m)	Average Coefficient of Permeability k, (cm/sec)	Soil Type*
FHT-1	1.5	9.537×10^{-7}	Very dense fine to medium

FHT-2	2.0	3.337×10^{-6}	sand with silt with trace fine gravels
FHT-1	3.0	3.177×10^{-5}	Very dense fine silty sand
FHT-2	4.0	5.394×10^{-5}	

*Soil type was based on the results of the nearest borehole (BH-13) results.

The above results show the range of values of coefficient of permeability between 10^{-7} to 10^{-5} cm/s (or 10^{-9} to 10^{-7} m/s) which is typical for fine sand-silt mixtures as can be noted in Table F below.

Table F. Order-of-magnitude values for permeability k, based on description of soil and by the United Classification System, m/s

10^0	10^{-2}	10^{-5}	10^{-9}	10^{-11}
Clean gravel GW, GP	Clean gravel and sand mixtures GW, GP, SW, SP GM	Sand-silt mixtures SM, SL, SC	Clays	

Some typical values of the order of magnitude for (exponent 10) coefficient of permeability, k values for various soils as presented in *J. Bowles, Foundation Analysis and Design, 5th Ed, 1996*.

The results also indicate that the silty sand materials from depth of 4.0m in FHT-2.0 are more pervious which can serve as guide in deciding the depth of the septic tank for the building.

9 **CHEMICAL ANALYSIS**

Various chemical tests were performed on soil samples selected from various depths of the boreholes. All the chemical tests were conducted in accordance with BS 1377: Part 3: 1990.

The results of tests on selected soil samples are summarized in Tables G below together with the required limits in accordance with the ACI Manual of Concrete Practice (2005), Part 3 and Part 4.

Table G. Results of Chemical Tests on Selected Soil Samples and Requirements For Concrete Exposed To Sulfate-Containing Solutions (Table 4.3.1 of ACI 350 ACI Manual of Concrete Practice 2005, Part 4)

Results of Chemical Tests on soil samples					Requirements For Concrete Exposed To Sulfate-Containing Solutions (from Table 4.3.1 of ACI 350)				
BH No	Depth of sample (m)	pH Value	Results of Tests, Water soluble Chloride (Cl) in Soil, %	Results of Tests, Water soluble sulphate (SO ₄) in Soil, %	Limit of Water soluble sulphate (SO ₄) in Soil, % by weight.	Sulphate Exposure	Cement Type	Maximum water-cementitious material ratio, by weight, normal weight concrete	Minimum $f'c$ normal weight & lightweight concrete (psi)
BH-1	1.5	7.98	0.0113	0.3186	0.20 to 2.00	Severe	V	0.40	5000
	5.0	8.38	0.0113	0.2104	0.20 to 2.00	Severe	V	0.40	5000
BH-2	2.5	8.92	0.0141	0.0062	0.00 to 0.10	Negligible	-	0.45	-
	6.0	9.18	0.0056	0.0303	0.00 to 0.10	Negligible	-	0.45	-
BH-3	2.0	8.98	0.0028	0.0085	0.00 to 0.10	Negligible	-	0.45	-
	4.0	4.0	0.0141	0.5142	0.20 to 2.00	Severe	V	0.40	5000
BH-4	1.0	7.98	0.0113	0.4576	0.20 to 2.00	Severe	V	0.40	5000
	2.5	8.19	0.0056	0.4475	0.20 to 2.00	Severe	V	0.40	5000
BH-5	2.0	8.18	0.0113	0.0467	0.00 to 0.10	Negligible	-	0.45	-
	8.0	9.03	0.0028	0.0293	0.00 to 0.10	Negligible	-	0.45	-
BH-6	1.0	7.98	0.0085	0.0187	0.00 to 0.10	Negligible	-	0.45	-
	4.0	8.06	0.0056	0.3536	0.20 to 2.00	Severe	V	0.40	5000
BH-7	0.5	8.15	0.0113	0.0648	0.00 to 0.10	Negligible	-	0.45	-
	2.5	8.47	0.0056	0.0260	0.00 to 0.10	Negligible	-	0.45	-
BH-8	3.0	8.04	0.0113	0.3944	0.20 to 2.00	Severe	V	0.40	5000
	6.0	8.98	0.0113	0.0487	0.00 to 0.10	Negligible	-	0.45	-
BH-9	4.0	8.57	0.0085	0.3213	0.20 to 2.00	Severe	V	0.40	5000
	8.0	8.49	0.0085	0.1215	0.10 to 0.20	Moderate	II	0.42	4500
BH-10	2.0	8.04	0.0595	0.0395	0.00 to 0.10	Negligible	-	0.45	-
	3.0	8.14	0.0425	0.1791	0.10 to 0.20	Moderate	II	0.42	4500
BH-11	0.5	8.54	0.0056	0.0342	0.00 to 0.10	Negligible	-	0.45	-
	2.5	8.72	0.0113	0.3901	0.00 to 0.10	Negligible	-	0.45	-
BH-12	1.0	8.57	0.0056	0.0668	0.00 to 0.10	Negligible	-	0.45	-
	2.5	8.64	0.0085	0.0253	0.00 to 0.10	Negligible	-	0.45	-
BH-13	2.5	8.04	0.0170	0.5100	0.20 to 2.00	Severe	V	0.40	5000
	5.0	8.46	0.0113	0.0428	0.00 to 0.10	Negligible	-	0.45	-
BH-14	0.5	7.98	0.0387	0.0184	0.00 to 0.10	Negligible	-	0.45	-
	9.0	9.56	0.0368	0.1069	0.10 to 0.20	Moderate	II	0.42	4500
BH-15	1.0	9.05	0.1248	0.5504	0.20 to 2.00	Severe	V	0.40	5000
	4.0	8.42	0.1106	0.0566	0.00 to 0.10	Negligible	-	0.45	-
BH-16	2.0	8.47	0.0055	0.0355	0.00 to 0.10	Negligible	-	0.45	-
	6.0	8.64	0.0056	0.0167	0.00 to 0.10	Negligible	-	0.45	-
BH-17	1.5	8.68	0.0538	0.0421	0.00 to 0.10	Negligible	-	0.45	-
	6.0	9.43	0.0141	0.0536	0.00 to 0.10	Negligible	-	0.45	-
BH-18	3.0	9.16	0.0113	0.0325	0.00 to 0.10	Negligible	-	0.45	-
	5.0	9.48	0.0056	0.0292	0.00 to 0.10	Negligible	-	0.45	-
BH-19	2.5	8.22	0.0425	0.1639	0.10 to 0.20	Moderate	II	0.42	4500
	3.0	9.72	0.0212	0.0411	0.00 to 0.10	Negligible	-	0.45	-
BH-20	0.5	8.24	0.0340	0.0681	0.00 to 0.10	Negligible	-	0.45	-
	6.0	8.98	0.0212	0.1063	0.10 to 0.20	Moderate	II	0.42	4500
Results of Chemical Tests on soil samples					Requirements For Concrete Exposed To Sulfate-Containing Solutions (from Table 4.3.1 of ACI 350)				
BH No	Depth of sample (m)	pH Value	Results of Tests, Water soluble Chloride (Cl) in Soil, %	Results of Tests, Water soluble sulphate (SO ₄) in Soil, %	Limit of Water soluble sulphate (SO ₄) in Soil, % by weight.	Sulphate Exposure	Cement Type	Maximum water-cementitious material ratio, by weight,	Minimum $f'c$ normal weight & lightweight concrete (psi)

								normal weight concrete	
BH-21	1.5	8.42	0.0113	0.0348	0.00 to 0.10	Negligible	-	0.45	-
	3.0	8.69	0.0085	0.0260	0.00 to 0.10	Negligible	-	0.45	-
BH-22	2.5	9.45	0.0113	0.0237	0.00 to 0.10	Negligible	-	0.45	-
	5.0	10.02	0.0085	0.0161	0.00 to 0.10	Negligible	-	0.45	-
BH-23	3.0	8.28	0.0170	0.0990	0.10 to 0.20	Moderate	II	0.42	4500
	6.0	8.36	0.0056	0.1001	0.10 to 0.20	Moderate	II	0.42	4500
BH-24	1.0	8.57	0.0113	0.0135	0.00 to 0.10	Negligible	-	0.45	-
	4.0	9.08	0.0056	0.0177	0.00 to 0.10	Negligible	-	0.45	-
BH-25	2.0	8.18	0.0312	0.1899	0.10 to 0.20	Moderate	II	0.42	4500
	5.0	8.91	0.0283	0.0958	0.10 to 0.20	Moderate	II	0.42	4500
BH-26	1.5	8.42	0.0170	0.0451	0.00 to 0.10	Negligible	-	0.45	-
	3.0	8.59	0.0198	0.0378	0.00 to 0.10	Negligible	-	0.45	-
BH-27	1.0	9.12	0.0368	0.0467	0.00 to 0.10	Negligible	-	0.45	-
	4.0	8.64	0.0226	0.1306	0.10 to 0.20	Moderate	II	0.42	4500
BH-28	2.5	8.15	0.0255	0.2423	0.20 to 2.00	Severe	V	0.40	5000
	6.0	8.91	0.0368	0.0747	0.00 to 0.10	Negligible	-	0.45	-
BH-29	2.5	8.14	0.0141	0.3605	0.20 to 2.00	Severe	V	0.40	5000
	6.0	8.56	0.0085	0.0747	0.00 to 0.10	Negligible	-	0.45	-
BH-30	1.0	8.28	0.0368	0.4480	0.20 to 2.00	Severe	V	0.40	5000
	2.0	8.43	0.0368	0.4266	0.20 to 2.00	Severe	V	0.40	5000
BH-31	2.0	8.24	0.0567	0.3776	0.20 to 2.00	Severe	V	0.40	5000
	4.0	8.45	0.0624	0.3423	0.20 to 2.00	Severe	V	0.40	5000
BH-32	2.5	8.36	0.0283	0.3660	0.20 to 2.00	Severe	V	0.40	5000
	5.0	8.39	0.0113	0.4908	0.20 to 2.00	Severe	V	0.40	5000
BH-33	3.0	7.95	0.0453	0.4536	0.20 to 2.00	Severe	V	0.40	5000
	6.0	8.34	0.0425	0.4721	0.20 to 2.00	Severe	V	0.40	5000

The minimum concrete strength and maximum water cementitious material ratio should be based on both ACI 350, Tables 4.3.1 and 4.2.2. When both these tables are considered, the lowest applicable maximum water cementitious material ratio and highest applicable minimum f'_c shall be used.

The summary of the results are appended in Plates B4.1 to B4.5 of this report.

9.1 Protection from Sulphates

To decide on the suitable type of cement against the severity of sulphate attack by the in-situ soil, reference should be made to Table H below. This is Table 4.3.1 of ACI 350, Requirements for Concrete Exposed to Sulphate-containing Solutions from ACI Manual of Concrete Practice (2005) Part 4.

Table H Requirements For Concrete Exposed To Sulfate-Containing Solutions
(as per Table 4.3.1, ACI 350, ACI Manual of Concrete Practice, 2005 Part 4)

Sulphate Exposure	Water soluble sulphate (SO ₄) in Soil, % by weight.	Sulphate (SO ₄) in Water, ppm	Cement Type	Maximum water-cementitious materials ratio, by weight normal-weight concrete	Minimum, f_c^* normal-weight and light-weight concrete (psi)
Negligible	0.00 to 0.10	0 to 150	-	0.45	-
Moderate	0.10 to 0.20	150 to 1500	II, IP(MS), IS(MS), I(PM)(MS), I(SM)(MS)	0.42	4500
Severe	0.20 to 2.00	1500 to 10,000	V	0.40	5000
Very severe	Over 2.00	Over 10,000	V plus pozzolan	0.40	5000

* f_c = specified compressive strength of concrete. A lower water cementations material ratio or higher strength may be required for corrosion protection for concrete exposed to Chlorides (ACI Table 4.2.2).

9.2 Protection from Chlorides

For corrosion to be initiated, there has to be certain minimum concentration of chloride-ions at the surface of the steel. However, according to ACI 318, Table 4.4.1 the maximum chloride-ion content of reinforced concrete is limited to 0.15 percent by weight of cement.

Therefore, prevention of corrosion lies in controlling the ingress of chlorides by the thickness of cover to reinforcement and by the penetrability of the concrete in the cover.

For concrete protection of reinforcement, ACI Code 350 Section 7.7 must be followed. The concrete to be used for containing steel reinforcement should have the following characteristics:-

- 1) The minimum concrete cover (to the reinforcement) for foundation should be 3 inches (7.5cm) as per requirement of ACI 350 Section 7.7.
- 2) Painting at least 3 coats of bituminous material is recommended.

The minimum concrete strength and maximum water cementitious material ratio should be based on both ACI 350, Tables 4.3.1 and 4.2.2. When both these tables are considered, the lowest applicable maximum water cementitious material ratio and highest applicable minimum f_c shall be used.

Effect of Chloride content in the concrete:

To protect the steel reinforcement from corrosion, the amount of Chloride in the concrete must be controlled. The chloride contents which are allowed in different types of reinforced concrete are given in ACI 318, Table 4.4.1.

Table I : Maximum Chloride Ion Content for Corrosion Protection of Reinforcement.
(Table 4.4.1, ACI 318, ACI Manual of Concrete Practice, 2005 Part 3)

Sl. No.	Type of Member	Maximum water soluble chloride ion (Cl ⁻) in concrete, percent by weight of cement
1	Prestressed concrete	0.06
2	Reinforced concrete exposed to Chloride in service	0.15
3	Reinforced concrete that will be dry or protected from moisture in service	1.00
4	Other reinforced concrete construction	0.30

The results of chemical tests showed the presence of chloride in soil. The chloride present in the soil will cause reinforcement corrosion if chloride ingress occurs. Therefore, the concrete with reinforcement exposed to such conditions should follow the requirements given in ACI 350, Table 4.2.2 (ACI Manual of Concrete Practice, 2005 Part 4)

TableJ: Requirement for Special Exposure Conditions
(as per Table 4.2.2, ACI 350, ACI Manual of Concrete Practice, 2005 Part 4)

Sl. No.	Exposure Condition	Maximum water-cementitious materials ratio, by weight, normal weight concrete	Minimum f'_c , psi
1	Concrete intended to have low permeability when exposed to water.	0.45	4000
2	Concrete exposed to freezing and thawing in a moist conditions or to deicing chemicals.	0.42	4500
3	For corrosion protection of reinforcement in concrete exposed to chlorides from deicing chemicals, salt, salt water, brackish water, seawater, or spray from these sources.	0.40	5000

f'_c = specified compressive strength of concrete.

The minimum concrete strength and maximum water cementitious material ratio should be based on both ACI 350, Tables 4.3.1 and 4.2.2. When both these tables are considered, the lowest applicable maximum water cementitious material ratio and highest applicable minimum f'_c shall be used.

10 MPW GENERAL NOTES AND RECOMMENDATIONS

10.1 M.P.W General Notes

- 10.1.1 This report is based on the results of boreholes sunk only.
- 10.1.2 The number, location, depth and level of the boreholes and the type of tests are the responsibility of the Designer.
- 10.1.3 The calculation of the bearing pressures of the soil are based on Terzaghi and Peck (1948 and 1967) on the assumption that:
 - a) The width of foundation is 1.5m, 2.0m and 3.0m.
 - b) The maximum allowable settlement is 2.5cm.
 - c) The effect of the ground water is ignored, as suggested by Meyerhof (1965)
- 10.1.4 Should any of the assumption differ from the actual field conditions the Designer should calculate his own values using the appropriate method and the given SPT values.
- 10.1.5 The level of the ground water, observed is just after completion of the borehole, unless otherwise mentioned. This water level may be considered approximate only. For determining the correct water level, open pits or observation wells are to be made.

10.2 M.P.W Recommendations

- 10.2.1 All foundations should preferably be placed on sound natural ground and compacted if necessary. If the foundation is on compacted fill, degree of compaction attained should be satisfactory.
- 10.2.2 In case of a demolished building site, the following precautions should be observed.
 - a) The level of the new foundation should be below that of the old one, below the disturbed soil.
 - b) It is to be ensured that no percolating pit, cesspool, old contaminated or loose soil exists below or near the proposed foundation.
- 10.2.3 In case no pressure for a particular depth is recommended by this stratum or the recommended bearing pressure of a lower stratum is less than that of the upper one, the allowable bearing capacity at the proposed foundation level should be determined by the Designer, at his own cost from a study of the stress distribution beneath the foundation.
- 10.2.4 In order to limit the differential settlement of the footings, the following measures may be taken:
 - a) Pressure on all ground bearings should be equal, as far as practicable.
 - b) The foundation level of all parts of the building should be same.
- 10.2.5 Cuttings, if any to be made, should have a clear distance from nearest footing equal to at least two times the depth from the initial footing in that of the cutting, otherwise special measures have to be taken to protect the foundation.

- 10.2.6 The Designer is expected to be familiar with the requirements of the recent British Standards, relevant ASTM and ACI Codes and the Kuwait MPW General Specification.
- 10.2.7 As mentioned above, this report represents boreholes sunk only. The site should be inspected by the Design Engineer after the excavation is over. In case different soil conditions than reported are found, the laboratory must be notified immediately, otherwise it will assume no responsibility for any consequence.
- 10.2.8 It is recommended to use sulphate resisting cement in all sub-construction or as recommended in BS 8004.

11 INCO-LAB General Notes and Limitations

A sanitary landfill is a technical name for a garbage dump. Garbage dumps may include old bedding, auto parts, demolition and construction refuse, broke-up pavements, metal cans, tires as well as smaller materials. It may also contain organic materials such as peat. As the refuse decays, the surface may become uneven or the underlying material may cavity, depending on the rapidity of action, garbage materials, and thickness of fill cover.

In using a landfill for construction, it may be extremely difficult to avoid settlements as the refuse decomposes and/or consolidates. Hence, there is no conclusive method of predicting settlement on a sanitary landfill. The forgoing opinion is presented in the Foundation Analysis and Design book by Joseph E. Bowles, 4th Edition.

In addition to that, MPW Recommendations state that "it is to be ensured that no percolating pit, cesspool, old contaminated or loose soil exists below or near the proposed foundation".

Therefore, and according to the above, we strongly recommend the removal of all sanitary fill (if encountered) prior to the placement of the foundation.

It is essential to note that the recommendations forming part of this report are based on the analysis of the data collected from the test borings and as such are only representative of the soil conditions at specific locations, times, and depths penetrated. They should not be treated as necessarily indicative of possible subsurface variability prevailing between the boring locations. In case subsurface conditions during or prior to construction by any means are indicative of conditions contrary to what has been noted and reported herein, the recommendations contained herein would require re-evaluation.

This report has been prepared solely for the purpose of assisting the architect/engineer in the design evaluation of the proposed project. Therefore, it may not contain sufficient data, or proper information to serve as the basis for preparation of construction cost estimates. A contractor wishing to bid on this project is urged to

consult a competent geotechnical engineer to assist in the interpretation of this report and/or in the performance of additional site-specific exploration for bid estimating purposes.

The owner/client should be aware that unanticipated soil/rock conditions are commonly encountered. Unforeseen subsurface conditions, such as perched ground water, soft deposits, hard layers, or cavities, may occur in localized areas and may require probing or corrections in the field (which may result in construction delays) to attain a properly constructed project. Therefore, this contingency should be fully considered in the project.

The following Tables and Appendices are attached and complete this report:

CHART

- 1 **Terzaghi & Peck (1948 & 1967) Chart for Isolated Footings of 1.5m, 2.0m and 3.0m widths and maximum settlement of 25mm (1") constructed at different depths below the existing ground level (EGL).**

TABLES

- 1.1 to 1.8 **- Net Allowable Bearing Capacity Results**

APPENDICES

- A - Field Activities**
- B - Laboratory Testing**
- C - Borehole Locations Plan and Soil Profiles**

**Respectfully Submitted,
INCO - LAB**

APPENDIX – A

FIELD ACTIVITIES

1. GENERAL

Field investigations were carried out on 19th to 22nd April 2007 and on 29th April to 5th May 2007. Five (5) boreholes were drilled to 10.0m depth and twenty eight (28) boreholes were drilled to 6.0m depth. Standard Penetration Tests (SPT) were performed at 0.5m interval to 3.0m depth, thereafter at 1.0m interval to the final depth of boring. Undisturbed samples using Dames and Moore sampler were also collected from selected depths for direct shear tests.

2. Drilling & Sampling

Drilling was carried out using augering techniques with a 100 mm diameter auger. Standard penetration tests (SPT) were carried out at regular intervals and disturbed samples were obtained for soil classification. The SPT samplers are driven using a 140 lb (63.5 kg) hammer falling freely through a vertical height of 30 inches (0.76m) and the number of blows required to drive the sampler through three successive increments of 150mm lengths were recorded on the log of borings. The N-30 values are calculated as the total number of blows for the last 30cm of penetration. The soils encountered were classified in accordance with the ASTM D 2487-90, Plate A1.

The key to log of boring is presented on Plate A2 and edited log of borings are presented on Plates A3.1 to A3.33.

3. In-Situ Falling Head Test

In-situ permeability of the subsurface soil was determined by Falling Head Test. The test was conducted within the vicinity of the proposed New Transmitting Building as shown in the attached boreholes location plan. The results are presented in Plates A4.1 to A4.2.2).

The following Plates are attached and complete this Appendix:

<u>PLATE</u>	<u>DESCRIPTION</u>
A1	- Revised Unified Soil Classification System ASTM D 2487-90
A2	- Key to Log of Boring
A3.1 to A3.33	- Log of Boring
A4.1 to A4.2.2	- Falling Head Test Results

APPENDIX – B

LABORATORY TESTING

1 General

Physical and chemical tests were performed on selected samples collected during the field investigation phase of this project. A brief description of the physical and chemical tests performed are given here under.

2 Physical Test

Various physical tests were performed to verify the field classification and to estimate the index and properties of subsurface materials. All tests were conducted in accordance with the current applicable ASTM/BS Standards. Results of the tests were summarized and presented herein.

2.1 Particle Size Distribution by Sieve Analysis

The gradation tests were performed on selected soil sample in accordance with ASTM D-422. The results were used to verify visual classifications. The results are given in Plate B1.1 to B1.33.

2.2 Moisture Content

Moisture Content on selected soil samples were determined in accordance with ASTM D-422. The results of the tests are given in Plate No. B1.1 to B1.33 along with the Sieve Analysis results.

2.3 Atterberg Limits

Atterberg limits (Liquid Limit, Plastic Limit and Plasticity Index) were performed on fine grained soil samples passing sieve 0.425mm according to ASTM Standard D 4318-84.

Liquid limits, plastic limits and plasticity index of soil samples were determined for estimating the natural soil consistency. These factors were used for ascertaining the classification of soils. The results of these tests are presented on Plate B2.1 to B2.27.

2.4 Direct Shear Tests

Direct shear box test were carried out on undisturbed samples recovered from the borings to determine the inter particle friction angle of the soils. Prior to shearing the test specimens, the soil is compacted into the shear box with original natural density determined from the undisturbed Dames and Moore samples. The rates of shearing used are 0.5mm/min.

The test procedure followed was ASTM Standard D 3080-90.

The results of the direct shear tests are shown on Plate B3.1 to B3.62. It should be noted that the shear stress versus normal pressure relationships were

developed based on the residual shear stress values. These values are normally obtained at a horizontal displacement of 5mm to 7.5mm.

2.5 Bulk Dry Density

Bulk and Dry Density of soil samples recovered by D & M samplers were determined in accordance with ASTM - D 3080-90. The results of the tests are given in Plate No. B3.1 to B3.62 along with the direct shear test results.

3 CHEMICAL TEST

Various chemical tests were performed on selected soil samples recovered during the field investigation of this project. All tests were conducted in general in accordance with British Standard 1377: Part 3: 1990 and Standard Methods. Test results are presented on Plate B4.1 & B4.5

The following plates are attached and complete this Appendix.

<u>Plate</u>		<u>Description</u>
B1.1 to B1.33	:	Particles Size Analysis & Moisture Content.
B2.1 to B2.27	:	Liquid Limit, Plastic Limit and Plasticity Index.
B3.1 to B3.62	:	Direct Shear Test Results & Bulk and Dry Density
B4.1 & B4.5	:	Chemical Test Results

SCHEDULE OF DELIVERABLES
TUNING SHELTER CONSTRUCTION CONTRACT

NO.	DESCRIPTION OF DELIVERABLE	DATE REQUIRED (IN CALENDAR DAYS)	NUMBER OF COPIES AND/OR LOCATION	LOCATION IN THE CONTRACT
1.	Proof of Insurance	14 Days after Contract Award	1 Copy to Contracting Officer	H.2
2.	Kick-off Meeting	14 Days after NTP (Notice to Proceed)	On Site	C.2.1.2
3.	Preliminary Design Review Meeting	7 Days after Receipt of IBB Comments on the 50% Design	Headquarters (HQ)	C.2.1.3
4.	Pre-Construction Meeting	15 Days before Mobilization	On Site	C.2.1.4
5.	Safety Plan	Prior to Pre-Construction Conference	3 Copies (HQ); 1 Copy (Site)	H.5
6.	Construction Submittals	Prior to Submission of Final Design	3 Copies (HQ); 1 Copy (Site)	C.2.1.7
7.	Preliminary (50%) Construction Drawings, Design Calculations, and Related Documentation	Prior to 100% Submission	3 Half-size Sets of Drawings and all other Documentation (HQ and Site). Electronic versions of AutoCad drawings and other documents shall also be furnished via email (HQ and Site).	C.2.2
8.	100% Construction Drawings, Design Calculations, and Related Documentation	Prior to Final Submission	3 Half-size Sets of Drawings and all other Documentation (HQ and Site). Electronic versions of AutoCad drawings and other documents shall also be furnished via email (HQ and Site).	C.2.2
9.	Final Construction Drawings, Design Calculations, and Related Documentation	15 Days Prior to Commencing Construction	1 Full-size and 3 Half-size Sets of Drawings and all other Documentation (HQ and Site); Electronic versions of AutoCad drawings and other documents shall also be furnished via email (HQ and Site).	C.2.2
10.	Beneficial Occupancy of Equipment Shelters Interiors	150 Days after NTP	On Site	F.2
11.	Government Acceptance of Equipment Shelters, Transmission Line Installation, and all Other Work	180 Days after NTP	On Site	E.4, F.2
12.	As-Built Drawings	30 Days After Government Acceptance	2 Full-size Sets of Drawings, and 1 CD-ROM of AutoCad Files (both HQ and Site)	C.2.2(d); F.5

International Broadcasting Bureau (IBB)

CAD Standards

Revision 8, 03/20/05

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INTRODUCTION

Overview

This document is intended to provide the International Broadcasting Bureau (IBB) with standards to ensure uniform and consistent CAD production. These standards will provide CAD users, engineers, and project managers with consistent guidelines for CAD production. This manual's objectives are as follows:

- Free the operator and project manager from repeatedly determining the conventions and procedures to be used on each project
- Create uniform design, presentation and construction information and establish a clear and precise method of communication
- Create a uniform installation configuration to limit the time and involvement in maintaining the CAD workstations

The CAD Standards shall be used at all times for all CAD production. Any deviations from these standards must have prior approval.

Why CAD Standards?

Within any project, no matter of its size, there is a need to share graphical information in an easy, quick and efficient manner, without causing the reworking of the data to suit individuals needs. For this to work, a common set of standards must be used and adhered to.

The long-term use of CAD data requires that all data files be created and modified in a consistent manner. This is to enable future users of the data to easily understand it. The way you create CAD drawings and how you use them becomes your CAD Standards.

"The Success of any CAD Standard depends largely on the co-operation of everybody using the system."

Purpose of this Document

This document specifies the guidelines, which CAD operators should adopt, to ensure that CAD data is of a high standard and to a uniform and consistent format.

This document is intended to be used as a regular reference, to assist the CAD Users in their 'day to day' model and drawing production.

WORKSTATION CONFIGURATION

Software

Installation

As of this writing, AutoCAD 2004 is the latest version, though these CAD Standards have been developed to accommodate all the following software:

- AutoCAD 2004
- AutoCAD LT 2004
- All industry-specific variations of AutoCAD based on the above versions including Architectural Desktop, Land Desktop, and Mechanical Desktop

Configuration

After the updates are installed, some configuration is needed. Many of the support files for the CAD Standard are located on the network so that every user has access to them. The remainder of this document will refer to that network location as:

X:\

For the IBB Headquarters in Washington, D.C., the "X:\" path is defined as:

S:\ *Engineer \ Tech* (mapped)

\\ *File1 \ s \ engineer \ tech* (full path)

If you are not part of the IBB Headquarters network, you will need to replace any instance of "X:\" within this document with the path to the CAD Standards on your network (please refer to the section named "Support Files" for more information).

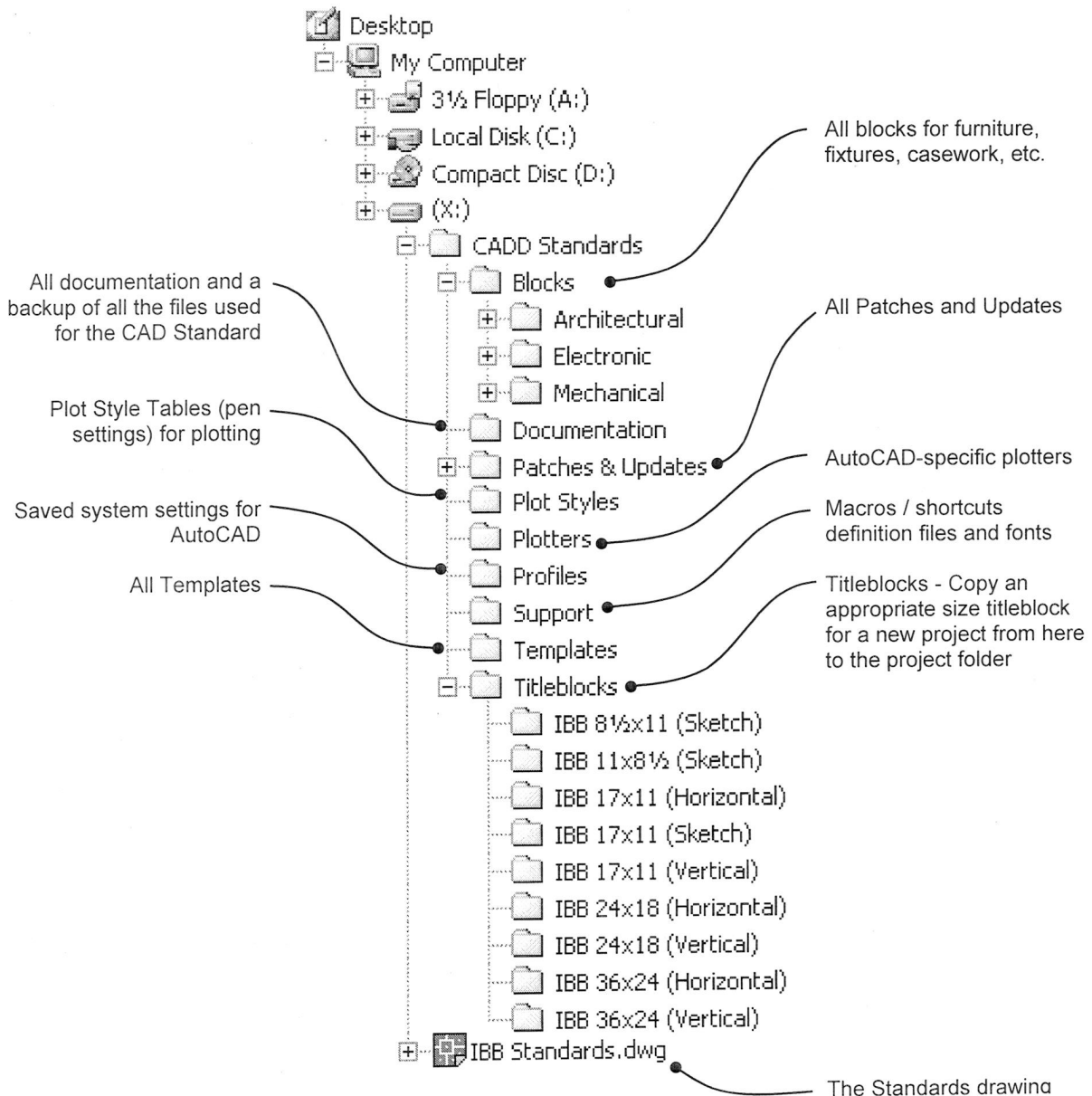
SUPPORT FILES

Overview

Even though AutoCAD is installed locally on each workstation, many files used by AutoCAD can be located on a network so that everyone will access the same information.

Network File Locations

The following illustrates the network folder structure where the support files for AutoCAD are located. It only shows the folders pertinent to the CAD Standard, many more may exist:



Note: Replace any instance of "X:\\" with your network path to the CAD Standards.

FILE ORGANIZATION AND NAMING CONVENTION

Overview

A system of file naming and organization has been developed based on:

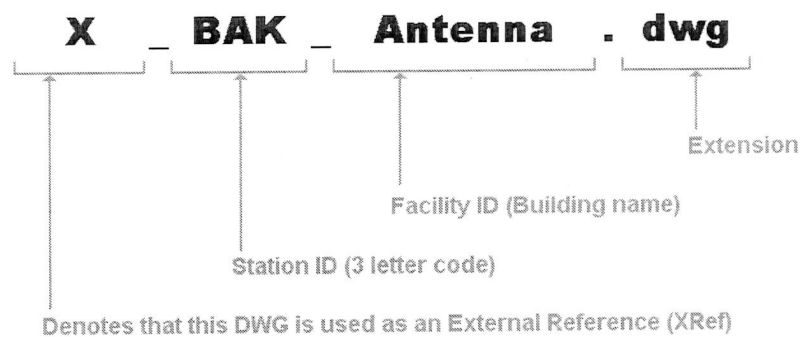
- Location (i.e. BAK for Bangkok, MOR for Morocco, etc.)
- Project Number (a unique four-digit number)
- Drawing type (an As-built or a Project drawing)

The following section details how the system works.

File Naming

As-built Drawings

The following diagram outlines the file naming convention for As-built drawings:

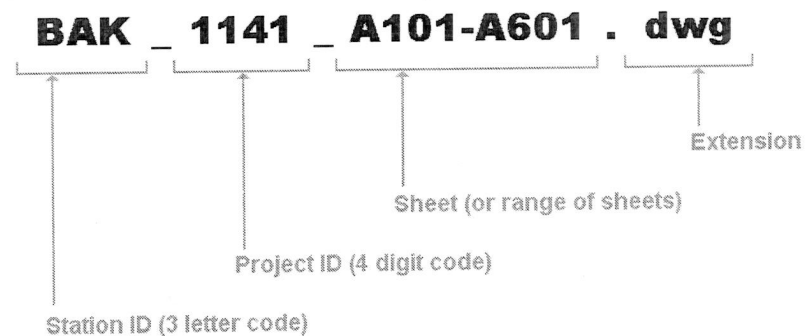


Some examples of the Facility ID (Building Name) include:

- Antenna
- Site
- Building

Project Drawings

The following diagram outlines the file naming convention for Project drawings:



Revision Note: The file must only contain one sheet not a range of sheets as shown above.

Sheet Naming Convention

The following outlines the naming convention for Project drawings:

Standard Architectural Drawing Set

G-00#	Cover Sheets
A-0##	Drawing Index, Symbols, General Notes, Abbreviations
AD1-0##	Architecture Demolition Plans
A-1##	Architecture Floor Plans, Reflective Ceiling Plans
A-2##	Building Elevations
A-3##	Building Sections
A-4##	Large scale plans
A-5##	Large scale elevations
A-6##	Large scale elevations - interior elevations
A-7##	Details
A-8##	Schedules and Diagrams
A-9##	3D Views (Isometric, perspectives, photographs)

Standard Antenna Drawing Set

AT-0##	Drawing Index, Symbols, General Notes, Abbreviations
ATD1-0##	Antenna Field Demolition Plans
AT-1##	Antenna Field Plans
AT-2##	Antenna Grounding Plan
AT-3##	Antenna Towers
AT-4##	Antenna Foundation Plans
AT-5##	Antenna Field One-Line Diagram
AT-6##	Antenna Field Electrical Distribution
AT-7##	Details
AT-8##	Antenna Switching System
AT-9##	User Preference

Standard Structural Drawing Set

S-00##	Abbreviations, Legend, Symbols & General Notes
SD1-0##	Structural Demolition Plans
S-1##	Structural Floor Plans
S-2##	User Preference
S-3##	User Preference
S-4##	User Preference
S-5##	User Preference
S-6##	Details
S-7##	Schedules
S-8##	User Preference
S-9##	User Preference

Standard Mechanical Drawing Set

M-00##	Abbreviations, Legend, Symbols & General Notes
MD1-0##	Mechanical Demolition Plans
M-1##	HVAC Floor Plans - Air Side
M-2##	HVAC Floor Plans - Water Side
M-3##	Building Sections
M-4##	Large Scale/Enlarged Plans
M-5##	Risers/Single Line Diagrams
M-6##	Details
M-7##	Schedules
M-8##	Control Diagrams
M-9##	Special Systems

Standard Plumbing Drawing Set

P-00##	Abbreviations, Legend, Symbols & General Notes
PD1-0##	Plumbing Demolition Plans
P-1##	Floor Plans
P-2##	User Preference
P-3##	Building Sections
P-4##	Large Scale/Enlarged Plans
P-5##	Risers/Single Line Diagrams
P-6##	Details
P-7##	Schedules
P-8##	Special Systems
P-9##	Special Systems, User Preference

Standard Fire Protection Drawing Set

F-00##	Abbreviations, Legend, Symbols & General Notes
FD1-0##	Fire Protection Demolition Plans
F-1##	Floor Plans
F-2##	User Preference
F-3##	Building Sections
F-4##	Large Scale/Enlarged Plans
F-5##	Risers/Single Line Diagrams
F-6##	Details
F-7##	Schedules
F-8##	Special Systems
F-9##	Special Systems, User Preference

Standard Electrical Drawing Set

E-00##	Abbreviations, Legend, Symbols & General Notes
ED1-0##	Electrical Demolition Plans
E-1##	Lighting Plans
E-2##	Power Plans
E-3##	Fire Alarm Plans
E-4##	Partial Plans/Closet Details
E-5##	Risers/Single Line Diagrams
E-6##	Details, Elevations, Sections
E-7##	Schedules
E-8##	Lightning Protection
E-9##	Special Systems

Standard Telecommunications Drawing Set

T-00##	Abbreviations, Legend, Symbols & General Notes
TD1-0##	Telecommunications Demolition Plans
T-1##	Telecommunications Plans
T-2##	User Preference
T-3##	User Preference
T-4##	Partial Plans/Closet Details
T-5##	Risers/Single Line Diagrams
T-6##	Details, Elevations, Sections
T-7##	Schedules
T-8##	Connectivity Diagrams
T-9##	Special Systems

LAYERING

Overview

To ensure that the drawing information is consistent, the placement of entities on the correct layer is essential. The golden rule with regards to using layers is:

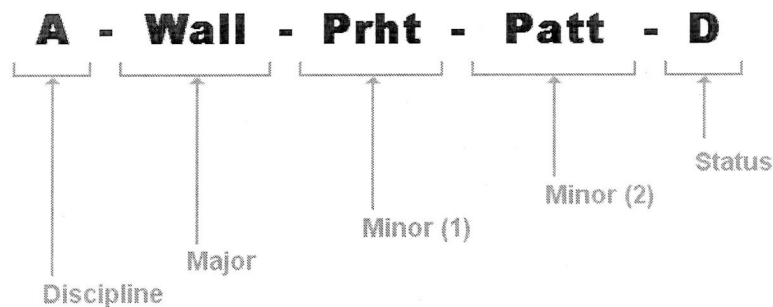
On no account should entities be drawn and saved on layer 0

Naming

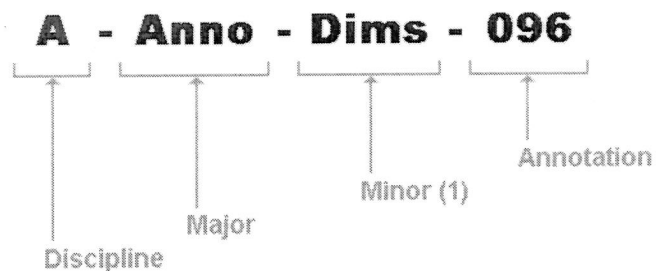
Layer naming is based on the AIA CAD Layer Guidelines, Version 2, published in 1998. The guideline consists of six fields:

- Discipline
- Major
- Minor1
- Minor2
- Status
- Annotation

Each field consists of four characters, except the Discipline and Status fields which are only one and the Annotation field is as many as needed (3 to 5). Each field is separated by a hyphen. Every layer name will have a Discipline and Major field, but the Minor1, Minor2, Status, and Annotation fields are optional. Only construction elements (i.e. walls, doors, and windows, not text and dimensions) will have a Status field, for example:



Only annotation (text, dimensions, etc.) will have an annotation field which is an indicator of drawing scale, for example:



The following is a list of the different possible values for each of the six fields. This list contains more values than are used in the layer list so that if new layers need to be created, you can use these values as reference:

DISCIPLINE	
VALUE	DESCRIPTION
A	Architectural
B	Geotechnical
C	Civil
D	Process
E	Electrical
F	Fire Protection
G	General
H	Hazardous Materials
I	Interiors
L	Landscape
M	Mechanical
O	Operations
P	Plumbing
Q	Equipment
R	Resource
S	Structural
T	Telecommunications
V	Surveying / Mapping
W	Civil Works
X	Other Disciplines
Z	Contractor / Shop Drawings

MAJOR	
VALUE	DESCRIPTION
Ancr	Anchors
Angl	Angles
Alrm	Alarm Systems
Anno	Annotation
Area	Areas
Beam	Beams
Bell	Bell Systems
Bldg	Buildings and Primary Structures
Brac	Bracing
Brdg	Bridges
CIng	Ceiling Information
Cols	Columns
Comm	Communication
Data	Data / LAN Systems
Deck	Structural Decks
Detl	Details
Door	Doors
Driv	Driveways

MAJOR	
VALUE	DESCRIPTION
Eqpm	Office Equipment
Esmt	Easements
Fenc	Fencing
Fire	Fire Protection
Fixt	Fixtures
Flor	Floor Information
Fndn	Foundations
Fram	Framing
Furn	Furniture
Glaz	Windows
Grid	Grids
Hdwr	Hardware
Hvac	HVAC
Irrg	Irrigation
Jois	Joists
Lite	Light Fixtures
Ngas	Natural Gas
Phon	Telephone Systems
Plan	Key Plans (floor plans)
Plnt	Plants
Pond	Ponds
Powr	Power
Prkg	Parking
Prop	Property Lines
Prot	Fire Protection Systems
Radl	Ground Radials
Rail	Railroads
Rdtn	Radiation Hazard Contours
Rfln	RF Transmission Lines
Road	Roadways
Roof	Roofs
Sect	Sections
Sert	Security Systems
Shev	Sheaves
Site	Site
Slab	Slabs
Sswr	Sanitary Sewer Systems
Strm	Storm Drainage Systems
Swlk	Sidewalks
Topo	Topography
Trns	Transmitters
Trus	Trusses
Wall	Walls
Watr	Water Supply Systems
Wire	Antenna Support Cables

MINOR1	
VALUE	DESCRIPTION
@###	Optional Detail Number (one letter and three numbers)
1lin	One-line diagrams
Abt	Anchor Bolts
Accs	Access
Alum	Aluminum
Asph	Asphalt Surfaces
Beam	Beams
Blun	Baluns
Bndy	Boundary
Brkl	Breaklines
Cabl	Cable / Cable Trays
Cars	Cars and Other Vehicles
Case	Casework
Catv	Cable Television
Cavi	Cavity
Cdff	Ceiling Diffusers
Char	Chairs and Other Seating
Circ	Circuits
Clhd	Ceiling Heads
CIng	Ceiling Mounted
Cntr	Centerline
Conc	Concrete
Cplr	Directional Couplers
Curb	Curbs
Deck	Decks
Devc	Devices
Diag	Diagrams
Dims	Dimensions
Dlay	Delay Lines
Door	Equipment Doors
Duct	Ductwork
Edge	Edge
Evtr	Elevator Cars and Equipment
File	File Cabinets
Fire	Fire Wall
Fixd	Fixed in Place
Fnsh	Finishes
Free	Freestanding
Full	Full Height
Grid	Grids
Head	Door and Window Headers
Hral	Handrails, Guard Rails
Jbox	Junction Boxes
Jois	Joists
Keyn	Keynotes
Legn	Legends, Symbol Keys

MINOR1	
VALUE	DESCRIPTION
Levl	Level Changes
Majr	Major Topographical Contours
Matc	Match Lines
Mbnd	Material Beyond
Mcut	Material Cut
Minr	Minor Topographical Contours
Move	Moveable
Nicn	Not in Contract
Nocu	Non-occupational
Note	Notes
Nplt	Non-plotting Graphic Information
Occp	Occupant or Employee Names
Occu	Occupational
Open	Openings
Otlr	Outlines
Ovhd	Overhead
Panl	Panels
Patt	Texture or Hatch Patterns
Plnt	Plants
Pnls	System Panels
Prht	Partial Height
Rail	Railings
Rais	Raised
Rdff	Return Air Diffusers
Redl	Redlines
Revs	Revisions
Risr	Risers
Rope	Wire Rope
Sdff	Supply Diffusers
Sign	Signage
Sill	Window Sills
Spcl	Specialties
Strd	Structural Strand
Strs	Stairs, Escalators, Ladders
Susp	Suspended Elements
Swch	Switches
Symb	Symbols
Tees	Main Tees
Text	Text
Thut	Tuning Hut
Titl	Drawing or Title Lines
Tptn	Toilet Partitions
Trfm	Transformers
Ttlb	Borders and Titleblocks
Util	Utilities
Wall	Walls
Wksf	System Work Surface Components

MINOR2	
VALUE	DESCRIPTION
Back	Back
Bore	Borings
Botm	Bottom
Horz	Horizontal
Iden	Identification Tags
Numb	Numbers
Ovhd	Overhead
Patt	Textures and Hatch Patterns
Perm	Permanent
Prim	Primary
Secd	Secondary
Temp	Temporary
Undr	Underground
Vert	Vertical









STATUS	
VALUE	DESCRIPTION
D	Existing to be Demolished
E	Existing to Remain
F	Future Work
M	Items to be Moved
N	New Work
T	Temporary Work
X	Not in Contract
1	Phase 1
2	Phase 2
3	Phase 3
4	Phase 4
5	Phase 5
6	Phase 6
7	Phase 7
8	Phase 8
9	Phase 9











ANNOTATION	
VALUE	DESCRIPTION
001	Full Scale
012	1" = 1'-0"
024	1/2" = 1'-0"
032	3/8" = 1'-0"
048	1/4" = 1'-0"
064	3/16" = 1'-0"
096	1/8" = 1'-0"
192	1/16" = 1'-0"
4200	1" = 350'-0"
9600	1" = 800'-0"
020	1:20 Scale
050	1:50 Scale
100	1:100 Scale
200	1:200 Scale
500	1:500 Scale
1000	1:1,000 Scale
2500	1:2,500 Scale
3000	1:3,000 Scale
5000	1:5,000 Scale
10000	1:10,000 Scale





Properties

All layer colors are predetermined and are not left up to the user. Most colors represent the different drawing entities. Some colors have special meaning. Color 30, a dull orange, is meant to represent “wrong layer” so that nothing should remain on a layer with that color when saved. Layer “0” is color 30 to help remind users not to leave entities on that layer. Color 243, a rose color, is meant to represent “non-plotting” so that nothing placed on a layer with that color will plot. The “DefPoints” and “Viewports” layers use this color.

Use the following table for reference for all layer properties:

AUTOCAD					
NAME	COLOR		LINETYPE	PLOT	OBJECTS / DESCRIPTION
0		30	Continuous		None
Construction		243	Continuous		Non-plotting Construction Lines
Defpoints		243	Continuous		Dimension Origin Points
Viewports		243	Continuous		Viewports
XREF-NAME		7	Continuous		X-Ref's (replace NAME with name of X-Ref)

ANNOTATION					
NAME	COLOR		LINETYPE	PLOT	OBJECTS / DESCRIPTION
A-Anno-Dims		7	Continuous		Dimensions
A-Anno-Keyn		7	Continuous		Keynotes and Flags
A-Anno-Legn		7	Continuous		Schedule Tables and Legends
A-Anno-Matc		7	Continuous		Match Lines
A-Anno-Note		7	Continuous		Notes
A-Anno-Nplt		243	Continuous		Non-plotting Annotation
A-Anno-Revs		7	Continuous		Revisions
A-Anno-Symb		7	Continuous		Symbols
A-Anno-Ttlb		7	Continuous		Titleblocks and Borders

AREAS					
NAME	COLOR		LINETYPE	PLOT	OBJECTS / DESCRIPTION
A-Area		6	Continuous		Areas and Spaces
A-Area-Iden		7	Continuous		Room Numbers
A-Area-Occp		7	Continuous		Room Names
A-Area-Patt		8	Continuous		Area and Space Hatching

CEILING INFORMATION

NAME	COLOR	LINETYPE	PLOT	OBJECTS / DESCRIPTION
A-Clng		3	Continuous	New Ceiling Objects (soffits, bulkheads, etc.)
A-Clng-D		10	Hidden2	Demo Ceiling Objects (soffits, bulkheads, etc.)
A-Clng-E		Continuous		Existing Ceiling Objects (soffits, bulkheads, etc.)
A-Clng-Grid		Continuous		New Ceiling Grids
A-Clng-Grid-D		Hidden2		Demo Ceiling Grids
A-Clng-Grid-E		Continuous		Existing Ceiling Grids
A-Clng-Iden		Continuous		Ceiling Tags
A-Clng-Nplt		Continuous		Non-plotting Ceiling Objects
A-Clng-Patt		Continuous		New Ceiling Hatching
A-Clng-Patt-D		Hidden2		Demo Ceiling Hatching
A-Clng-Patt-E		Continuous		Existing Ceiling Hatching

DETAILS

NAME	COLOR	LINETYPE	PLOT	OBJECTS / DESCRIPTION
A-Detl		Continuous		Details
A-Detl-Dims		Continuous		Dimensions
A-Detl-Keyn		Continuous		Keynotes and Flags
A-Detl-Mcut		Continuous		Material Cut
A-Detl-Medm		Continuous		Medium Lines
A-Detl-Note		Continuous		Notes
A-Detl-Patt		Continuous		Hatching
A-Detl-Symb		Continuous		Symbols
A-Detl-Thck		Continuous		Thick Lines
A-Detl-Thin		Continuous		Thin Lines
A-Detl-Ttlb		Continuous		Titleblocks and Borders
A-Detl-Xthn		Continuous		Extra Thin Lines

DOORS

NAME	COLOR	LINETYPE	PLOT	OBJECTS / DESCRIPTION
A-Door		Continuous		New Doors
A-Door-D		Hidden2		Demo Doors
A-Door-E		Continuous		Existing Doors
A-Door-Iden		Continuous		Door Tags

FLOOR INFORMATION

NAME	COLOR	LINETYPE	PLOT	OBJECTS / DESCRIPTION
A-Eqpm		Continuous		New Office Equipment / Appliances
A-Eqpm-D		Hidden2		Demo Office Equipment / Appliances
A-Eqpm-E		Continuous		Existing Office Equipment / Appliances
A-Eqpm-Iden		Continuous		Office Equipment / Appliance Tags
A-Eqpm-Nicn		Continuous		Office Equipment / Appliance Not in Contract
A-Flor-Case		Continuous		New Casework
A-Flor-Case-D		Hidden2		Demo Casework
A-Flor-Case-E		Continuous		Existing Casework
A-Flor-Case-Iden		Continuous		Casework Tags
A-Flor-Evtr		Continuous		Elevators and Equipment
A-Flor-Hral		Continuous		New Handrails / Guardrails
A-Flor-Hral-D		Hidden2		Demo Handrails / Guardrails

FLOOR INFORMATION

NAME	COLOR	LINETYPE	PLOT	OBJECTS / DESCRIPTION
A-Flor-Hral-E		54	Continuous	Existing Handrails / Guardrails
A-Flor-Iden		7	Continuous	Finish Tags
A-Flor-Patt		8	Continuous	New Floor Hatching / Patterns
A-Flor-Patt-D		10	Hidden2	Demo Floor Hatching / Patterns
A-Flor-Patt-E		252	Continuous	Existing Floor Hatching / Patterns
A-Flor-Spcl		1	Continuous	New Specialties (toilet room accessories, display cases)
A-Flor-Spcl-D		10	Hidden2	Demo Specialties (toilet room accessories, display cases)
A-Flor-Spcl-E		14	Continuous	Existing Specialties (toilet room accessories, display cases)
A-Flor-Strs		3	Continuous	New Stairs and Escalators
A-Flor-Strs-D		10	Hidden2	Demo Stairs and Escalators
A-Flor-Strs-E		94	Continuous	Existing Stairs and Escalators
A-Flor-Tptn		2	Continuous	New Toilet Partitions
A-Flor-Tptn-D		10	Hidden2	Demo Toilet Partitions
A-Flor-Tptn-E		54	Continuous	Existing Toilet Partitions

FURNISHINGS













NAME	COLOR	LINETYPE	PLOT	OBJECTS / DESCRIPTION
A-Furn		1	Continuous	New Furnishings
A-Furn-D		10	Hidden2	Demo Furnishings
A-Furn-E		14	Continuous	Existing Furnishings
A-Furn-Iden		7	Continuous	Furnishing Tags
A-Furn-Pnls		2	Continuous	New Systems Furniture Panels
A-Furn-Pnls-D		10	Hidden2	Demo Systems Furniture Panels
A-Furn-Pnls-E		54	Continuous	Existing Systems Furniture Panels
A-Furn-Wksf		2	Continuous	New Systems Furniture Worksurfaces
A-Furn-Wksf-D		10	Hidden2	Demo Systems Furniture Worksurfaces
A-Furn-Wksf-E		54	Continuous	Existing Systems Furniture Worksurfaces


















WINDOWS






















NAME	COLOR	LINETYPE	PLOT	OBJECTS / DESCRIPTION
A-Glaz		3	Continuous	New Windows / Glazing
A-Glaz-D		10	Hidden2	Demo Windows / Glazing
A-Glaz-E		94	Continuous	Existing Windows / Glazing
A-Glaz-Iden		7	Continuous	Window Tags
A-Glaz-Sill		1	Continuous	New Window Sills
A-Glaz-Sill-D		10	Hidden2	Demo Window Sills
A-Glaz-Sill-E		14	Continuous	Existing Window Sills










ROOFS



NAME	COLOR	LINETYPE	PLOT	OBJECTS / DESCRIPTION
A-Roof		4	Continuous	Roofs
A-Roof-Otln		1	Dashed	Roof Outlines

























SECTIONS					
NAME	COLOR	LINETYPE	PLOT	OBJECTS / DESCRIPTION	
A-Sect		7	Continuous		Sections
A-Sect-Dims		7	Continuous		Dimensions
A-Sect-Keyn		7	Continuous		Keynotes and Flags
A-Sect-Mcut		5	Continuous		Material Cut
A-Sect-Medm		3	Continuous		Medium Lines
A-Sect-Note		7	Continuous		Notes
A-Sect-Patt		8	Continuous		Hatching
A-Sect-Symb		7	Continuous		Symbols
A-Sect-Thck		4	Continuous		Thick Lines
A-Sect-Thin		2	Continuous		Thin Lines
A-Sect-Ttlb		7	Continuous		Titleblocks and Borders
A-Sect-Xthn		1	Continuous		Extra Thin Lines





WALLS					
NAME	COLOR	LINETYPE	PLOT	OBJECTS / DESCRIPTION	
A-Wall		4	Continuous		New Walls
A-Wall-Comp		1	Continuous		New Wall Components
A-Wall-Comp-E		14	Continuous		Existing Wall Components
A-Wall-D		10	Hidden2		Demo Walls
A-Wall-E		134	Continuous		Existing Walls
A-Wall-Head		1	Dashed2		New Door and Window Headers
A-Wall-Head-D		10	Hidden2		Demo Door and Window Headers
A-Wall-Head-E		14	Dashed2		Existing Door and Window Headers
A-Wall-Iden		7	Continuous		Wall Tags
A-Wall-Open		2	Dashed2		New Openings
A-Wall-Open-E		54	Dashed2		Existing Openings
A-Wall-Patt		8	Continuous		New Wall Hatching
A-Wall-Patt-D		14	Hidden2		Demo Wall Hatching
A-Wall-Patt-E		252	Continuous		Existing Wall Hatching
A-Wall-Prht		2	Continuous		New Partial-height Walls
A-Wall-Prht-D		10	Hidden2		Demo Partial-height Walls
A-Wall-Prht-E		54	Continuous		Existing Partial-height Walls

CIVIL				
NAME	COLOR	LINETYPE	PLOT	OBJECTS / DESCRIPTION
C-Anno-Dims		7	Continuous	Dimensions
C-Anno-Keyn		7	Continuous	Keynotes and Flags
C-Anno-Legn		7	Continuous	Schedule Tables and Legends
C-Anno-Matc		7	Continuous	Match Lines
C-Anno-Note		7	Continuous	Notes
C-Anno-Nplt		243	Continuous	Non-plotting Annotation
C-Anno-Revs		7	Continuous	Revisions
C-Anno-Symb		7	Continuous	Symbols
C-Anno-Ttlb		7	Continuous	Titleblocks and Borders
C-Bldg		6	Continuous	Building Footprints
C-Bldg-Patt		8	Continuous	Building Footprints Hatching
C-Brdg		5	Continuous	Bridges
C-Driv		3	Continuous	Driveways
C-Fenc		2	Fenceline1	Fences
C-Ngas		6	Gas_Line	Gas Lines
C-Pond		3	Continuous	Bodies of Water
C-Powr		4	Dashed	Power Lines
C-Prkg		2	Continuous	Pavement Markings
C-Prkg-Cars		1	Continuous	Vehicles
C-Prop		5	Phantom	Property Lines
C-Prop-Esmt		3	Divide	Easements
C-Prop-Sbck		4	Border	Setbacks
C-Rail		3	Continuous	Railroads
C-Road-Cntr		1	Center	Centerlines
C-Road-Curb		3	Continuous	Curbs
C-Sswr		5	DashDot	Sanitary Sewers
C-Strm		5	Hidden	Storm Water Drains
C-Swlk		2	Continuous	Sidewalks
C-Topo-Majr		2	Continuous	Major Contour Lines
C-Topo-Minr		1	Continuous	Minor Contour Lines
C-Wall		4	Continuous	Retaining Walls
C-Watr		6	Border	Water Lines

ELECTRICAL					
NAME	COLOR		LINETYPE	PLOT	OBJECTS / DESCRIPTION
E-Alm		4	Continuous		Alarm Systems
E-Anno-Dims		7	Continuous		Dimensions
E-Anno-Keyn		7	Continuous		Keynotes and Flags
E-Anno-Legn		7	Continuous		Schedule Tables and Legends
E-Anno-Matc		7	Continuous		Match Lines
E-Anno-Note		7	Continuous		Notes
E-Anno-Nplt		243	Continuous		Non-plotting Annotation
E-Anno-Revs		7	Continuous		Revisions
E-Anno-Symb		7	Continuous		Symbols
E-Anno-Ttlb		7	Continuous		Titleblocks and Borders
E-Comm		4	Continuous		New Telephone/Communication Systems
E-Comm-D		14	Hidden2		Demo Telephone/Communication Systems
E-Comm-E		134	Continuous		Existing Telephone/Communication Systems
E-Data		3	Continuous		New Data/LAN Systems
E-Data-D		14	Hidden2		Demo Data/LAN Systems
E-Data-E		94	Continuous		Existing Data/LAN Systems
E-Lite		4	Continuous		New Lighting
E-Lite-D		14	Hidden2		Demo Lighting
E-Lite-E		134	Continuous		Existing Lighting
E-Lite-Emer		5	Continuous		New Emergency Lighting
E-Lite-Emer-D		14	Hidden2		Demo Emergency Lighting
E-Lite-Emer-E		174	Continuous		Existing Emergency Lighting
E-Lite-Exit		5	Continuous		New Exit Lighting
E-Lite-Exit-D		14	Hidden2		Demo Exit Lighting
E-Lite-Exit-E		174	Continuous		Existing Exit Lighting
E-Lite-Iden		7	Continuous		Lighting Tags
E-Lite-Swch		3	Continuous		New Switches
E-Lite-Swch-D		14	Hidden2		Demo Switches
E-Lite-Swch-E		94	Continuous		Existing Switches
E-Powr		2	Continuous		New Power / Wiring
E-Powr-D		14	Hidden2		Demo Power / Wiring
E-Powr-E		54	Continuous		Existing Power / Wiring
E-Powr-Iden		7	Continuous		Power / Wiring Tags
E-Sert		4	Continuous		New Security Systems
E-Sert-D		14	Hidden2		Demo Security Systems
E-Sert-E		134	Continuous		Existing Security Systems

LANDSCAPE					
NAME	COLOR		LINETYPE	PLOT	OBJECTS / DESCRIPTION
L-Plnt		1	Continuous		Landscaped Plants and Shrubs
L-Site		2	Continuous		Site Improvements

MECHANICAL					
NAME	COLOR	LINETYPE	PLOT	OBJECTS / DESCRIPTION	
M-Anno-Dims		7	Continuous		Dimensions
M-Anno-Keyn		7	Continuous		Keynotes and Flags
M-Anno-Legn		7	Continuous		Schedule Tables and Legends
M-Anno-Matc		7	Continuous		Match Lines
M-Anno-Note		7	Continuous		Notes
M-Anno-Nplt		243	Continuous		Non-plotting Annotation
M-Anno-Revs		7	Continuous		Revisions
M-Anno-Symb		7	Continuous		Symbols
M-Anno-Ttlb		7	Continuous		Titleblocks and Borders
M-Hvac		4	Continuous		New HVAC Systems
M-Hvac-D		14	Hidden2		Demo HVAC Systems
M-Hvac-E		134	Continuous		Existing HVAC Systems
M-Hvac-Iden		7	Continuous		HVAC System Tags
M-Hvac-Rdff		4	Continuous		New Return Air Diffusers
M-Hvac-Rdff-D		14	Hidden2		Demo Return Air Diffusers
M-Hvac-Rdff-E		134	Continuous		Existing Return Air Diffusers
M-Hvac-Sdff		4	Continuous		New Supply Air Diffusers
M-Hvac-Sdff-D		14	Hidden2		Demo Supply Air Diffusers
M-Hvac-Sdff-E		134	Continuous		Existing Supply Air Diffusers
M-Pipe		3	Continuous		New Piping Systems
M-Pipe-D		14	Hidden2		Demo Piping Systems
M-Pipe-E		94	Continuous		Existing Piping Systems
M-Pipe-Iden		7	Continuous		Piping Tags

PLUMBING					
NAME	COLOR	LINETYPE	PLOT	OBJECTS / DESCRIPTION	
P-Fixt		2	Continuous		New Plumbing Fixtures
P-Fixt-D		14	Hidden2		Demo Plumbing Fixtures
P-Fixt-E		54	Continuous		Existing Plumbing Fixtures
P-Fixt-Iden		7	Continuous		Plumbing Fixture Tags

EQUIPMENT					
NAME	COLOR	LINETYPE	PLOT	OBJECTS / DESCRIPTION	
Q-Radl		3	Continuous		Ground Radials
Q-Rdtn		1	Continuous		Radiation Hazard Contours
Q-Rdtn-Nocu		1	Continuous		Radiation Hazard Contours – Non-occupational
Q-Rdtn-Occu		1	Continuous		Radiation Hazard Contours – Occupational
Q-Rfln		2	Continuous		RF Transmission Lines
Q-Rfln-Blun		2	Continuous		RF Transmission Lines – Baluns
Q-Rfln-Cplr		2	Continuous		RF Transmission Lines – Directional Couplers
Q-Rfln-Dlay		2	Continuous		RF Transmission Lines – Delay Lines
Q-Rfln-Eqpm		2	Continuous		RF Transmission Lines – All Associated Equipment
Q-Rfln-Swch		2	Continuous		RF Transmission Lines – Slew Switches
Q-Rfln-Thut		2	Continuous		RF Transmission Lines – Tuning Huts
Q-Rfln-Trfm		2	Continuous		RF Transmission Lines – RF Transformers
Q-Trns		4	Continuous		Transmitters
Q-Trns-Comm		2	Continuous		Transmitters – Communications Equipment
Q-Trns-Ctrl		2	Continuous		Transmitters – Control Room Equipment

STRUCTURAL					
NAME	COLOR		LINETYPE	PLOT	OBJECTS / DESCRIPTION
S-Ancr		2	Continuous		Anchors
S-Angl		2	Continuous		Angles
S-Anno-Dims		7	Continuous		Dimensions
S-Anno-Keyn		7	Continuous		Keynotes and Flags
S-Anno-Legn		7	Continuous		Schedule Tables and Legends
S-Anno-Matc		7	Continuous		Match Lines
S-Anno-Note		7	Continuous		Notes
S-Anno-Nplt		243	Continuous		Non-plotting Annotation
S-Anno-Revs		7	Continuous		Revisions
S-Anno-Symb		7	Continuous		Symbols
S-Anno-Ttlb		7	Continuous		Titleblocks and Borders
S-Beam		5	Phantom		Beams
S-Brac		3	Dashed		Braces
S-Cols		5	Continuous		Columns
S-Grid		8	Center2		Column Grids
S-Grid-Dims		7	Continuous		Column Grid Dimensions
S-Grid-Iden		8	Center2		Column Grid Bubbles
S-Grid-Nplt		243	Continuous		Non-plotting Column Grids
S-Hdwr		2	Continuous		Hardware
S-Jois		4	Dashdot		Joists
S-Shev		2	Continuous		Sheaves
S-Slab		1	Continuous		Slabs
S-Trus		4	Continuous		Trusses
S-Wire		5	Continuous		Antenna Support Cables
S-Wire-Strd		5	Continuous		Antenna Support Cables – Structural Strand
S-Wire-Rope		4	Continuous		Antenna Support Cables – Wire Rope

TEMPLATES

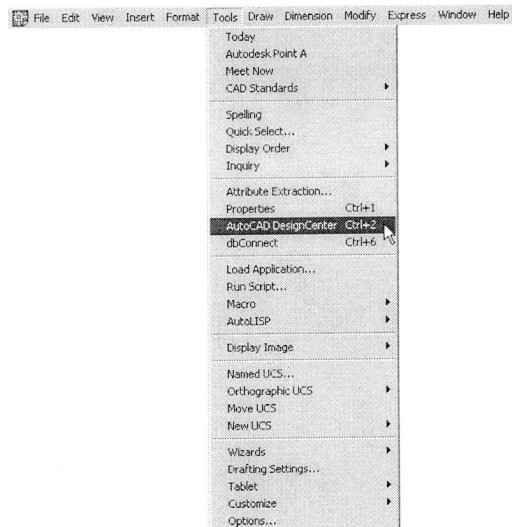
Overview

Templates allow each user to begin with the standards already incorporated into their new drawing. Templates can be used to begin a new drawing or to work with existing drawings.

Sometimes information is purged from a drawing that is later needed (for example, some layers may have been purged accidentally). Re-inserting any of this information is handled with the use of a "Standards" drawing. This is a DWG file called:

X:\CADD Standards\IBB Standards.dwg

Anytime you need information not already contained within the drawing, you can drag-and-drop that information (layers, layouts, blocks, etc.) from the Standards drawing using the AutoCAD DesignCenter...



Drawing Setup

The templates ("IBB Imperial Template.dwt" and "IBB Metric Template.dwt") and Standards drawing ("IBB Standards.dwg") include the following information and configurations:

Units and Limits

The units are set to Architectural (for the imperial template) with a precision of 1/32" and to Decimal, equating to millimeters, (for the metric template) with a precision of 0.1 units. The limits reflect an Architectural 'D' size sheet (24" x 36") at 1/8" = 1'-0" scale for Architectural and 1:100 for Metric.

Layers

All the standard layers are included and set with the correct properties. For more information and a complete layer list with corresponding properties, see the section titled "Layering."

Text and Dimension Styles

All text and dimension styles are included in the templates and should not be modified. For more information, see the sections titled "Text" and "Dimensions."

Layouts

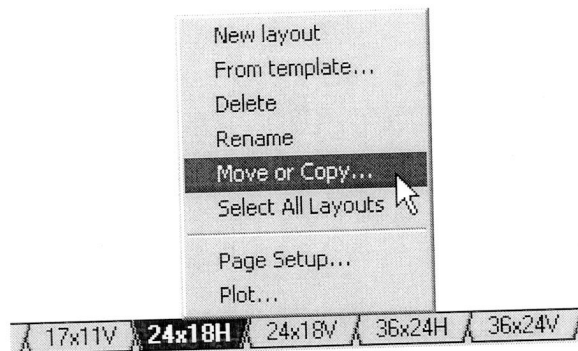
The Standards drawing ("IBB Standards.dwg") includes several layouts, all named after sheet sizes and titleblock orientation (horizontal or vertical). These layouts are blank and are setup to receive externally referenced project titleblocks. They contain viewports and have page setups assigned to them for plotting purposes. The names of these layouts are:

- "8½x11S (Blank)" (Sketch)
- "11x8½S (Blank)" (Sketch)
- "17x11S (Blank)" (Sketch)
- "17x11H" (Horizontal) and "17x11V" (Vertical)
- "24x18H" (Horizontal) and "24x18V" (Vertical)
- "36x24H" (Horizontal) and "36x24V" (Vertical)

Also included with these blank layouts are three sketch layouts that contain sketch titleblocks. These layouts are used for quick drag-and-drop insertion into a sheet drawing without the need to create an externally referenced project sketch titleblock. The names of these layouts are:

- "8½x11S" (Sketch titleblock included)
- "11x8½S" (Sketch titleblock included)
- "17x11S" (Sketch titleblock included)

After the required layout or layouts have been imported into a sheet drawing they can be copied, moved, and renamed within that sheet drawing by right-clicking on the layout tab and choosing the appropriate menu item from the shortcut menu:



Existing Drawings

To work with existing drawings that do not yet use the standards, just start with the appropriate template and insert the existing drawing just as if it was a block. After exploding it, you can then save it back to the existing drawing and overwrite it.

TEXT

Styles

All text should be one of the standard styles outlined below. Each style uses its own fonts and height settings and is specific to a particular scale. The following is a list of all the text styles and their properties:

TEXT STYLES				
STYLE	FONT	WIDTH	HEIGHT	DESCRIPTION
IBB Notes	RomanS	0.8	0"	Notes, Keynotes, Labels
IBB Headers	Arial	1.0	0"	Headers, Room Title, Bold Notes
IBB Titles	Arial Bold	1.0	0"	Titles, Very Large Notes
IBB Dimensions	RomanS	0.8	0"	Dimensions

The text heights are all set to 0" so that the height can be determined upon insertion. The following tables can be used as a reference when placing text and determining their heights, both imperial and metric:

WORKING SCALE:		SET TEXT HEIGHT TO:		
UNITS	SCALE	IBB Notes	IBB Headers	IBB Titles
Imperial	Full Scale	3/32"	1/8"	1/4"
	1" = 1'-0"	1 1/8"	1 1/2"	3"
	1/2" = 1'-0"	2 1/4"	3"	6"
	3/8" = 1'-0"	3"	4"	8"
	1/4" = 1'-0"	4 1/2"	6"	1'-0"
	3/16" = 1'-0"	6"	8"	1'-4"
	1/8" = 1'-0"	9"	1'-0"	2'-0"
	1/16" = 1'-0"	1'-6"	2'-0"	4'-0"
	1" = 350'-0"	32'-9 3/4"	43'-9"	87'-6"
	1" = 800'-0"	75'-0"	100'-0"	200'-0"
	1:20	1 7/8"	2 1/2"	5"
	1:50	4 11/16"	6 1/4"	1'-0 1/2"
	1:100	9 3/8"	1'-0 1/2"	2'-1"
	1:200	1'-6 3/4"	2'-1"	4'-2"
	1:500	3'-10 7/8"	5'-2 1/2"	10'-5"
	1:1,000	7'-9 3/4"	10'-5"	20'-10"
	1:2,500	19'-6 3/8"	26'-0 1/2"	52'-1"
	1:3,000	23'-5 1/4"	31'-3"	62'-6"
	1:5,000	39'-0 3/4"	52'-1"	104'-2"
	1:10,000	78'-1 1/2"	104'-2"	208'-4"

WORKING SCALE:		SET TEXT HEIGHT TO:		
UNITS	SCALE	IBB Notes	IBB Headers	IBB Titles
Metric	Full Scale	2.5 mm	3 mm	6 mm
	1:20	50 mm	60 mm	120 mm
	1:50	125 mm	150 mm	300 mm
	1:100	250 mm	300 mm	600 mm
	1:200	500 mm	600 mm	1,200 mm
	1:500	1,250 mm	1,500 mm	3,000 mm
	1:1,000	2,500 mm	3,000 mm	6,000 mm
	1:2,500	6,250 mm	7,500 mm	15,000 mm
	1:3,000	7,500 mm	9,000 mm	18,000 mm
	1:5,000	12,500 mm	15,000 mm	30,000 mm
	1:10,000	25,000 mm	30,000 mm	60,000 mm

DIMENSIONS

Styles

Dimension Styles are drawing scale specific so that they can all plot out the same size even though their may be several drawing scales used. Each dimension style is exactly the same except for the "Use overall scale of..." setting (also known as the DIMSCALE). New dimension styles can be created by simply basing them on a current dimension style and changing the overall scale to match the plotted scale. For example, if you only have a style called "IBB Dims 096", used for 1/8" scale drawings, but you need to plot at 1/16", make a new dimension style based on "IBB Dims 096" and call it "IBB Dims 192", then change the overall scale to 192.

The following is a list of some of the dimension styles for both imperial and metric units:

DIMENSION STYLES		
UNITS	STYLE	DRAWING SCALE
Imperial	IBB Imperial 001	Full Scale
	IBB Imperial 012	1" = 1'-0"
	IBB Imperial 024	1/2" = 1'-0"
	IBB Imperial 032	3/8" = 1'-0"
	IBB Imperial 048	1/4" = 1'-0"
	IBB Imperial 064	3/16" = 1'-0"
	IBB Imperial 096	1/8" = 1'-0"
	IBB Imperial 128	3/32" = 1'-0"
	IBB Imperial 192	1/16" = 1'-0"
	IBB Imperial 4200	1" = 350'-0"
	IBB Imperial 9600	1" = 800'-0"
Metric	IBB Metric 1	1:1
	IBB Metric 020	1:20
	IBB Metric 050	1:50
	IBB Metric 100	1:100
	IBB Metric 200	1:200
	IBB Metric 500	1:500
	IBB Metric 1000	1:1,000
	IBB Metric 2500	1:2,500
	IBB Metric 3000	1:3,000
	IBB Metric 5000	1:5,000
	IBB Metric 10000	1:10,000

Dimension Variables

For reference purposes, the following is a list of the dimension variable settings for all dimension styles (the only variable different between styles is the DIMSCALE):

IBB IMPERIAL 1		
DESCRIPTION	VARIABLE	VALUE
Alt precision	DIMALTD	2
Alt prefix and suffix	DIMAPOST	
Alt roundoff	DIMALTRND	0"
Alt scale factor	DIMALTF	25.4
Alt tol precision	DIMALTTD	2
Alt tol zeroes	DIMALTTZ	0
Alt units	DIMALTU	2
Alt zeroes	DIMALTZ	0
Alternate units	DIMALT	Off
Angle format	DIMAUNIT	0
Angle precision	DIMADEC	1
Angle zero suppression	DIMAZIN	0
Arrow	DIMBLK	ClosedFilled
Arrow 1	DIMBLK1	ArchTick
Arrow 2	DIMBLK2	ArchTick
Arrow size	DIMASZ	3/32"
Center mark size	DIMCEN	3/32"
Decimal separator	DIMDSEP	.
Dim line LW	DIMLWD	-2
Dim line color	DIMCLRD	BYBLOCK
Dim line ext	DIMDLE	1/16"
Dim line forced	DIMTOFL	On
Dim line spacing	DIMDLI	5/8"
Ext line LW	DIMLWE	-2
Ext line color	DIMCLRE	BYBLOCK
Ext line extension	DIMEXE	1/16"
Ext line offset	DIMEXO	1/16"
Fit: arrow and text	DIMATFIT	3
Fit: text movement	DIMTMOVE	2
Fraction format	DIMFRAC	1
Leader arrow	DIMLDRBLK	ClosedFilled
Length scale	DIMLFAC	1
Length units	DIMLUNIT	4
No dim line 1	DIMSD1	Off
No dim line 2	DIMSD2	Off
No dim lines outside	DIMSOXD	Off
No ext line 1	DIMSE1	Off
No ext line 2	DIMSE2	Off
Precision	DIMDEC	2
Roundoff	DIMRND	0"
Separate arrows	DIMSAH	On
Text color	DIMCLRT	BYBLOCK
Text height	DIMTXT	3/32"
Text inside	DIMTIX	On
Text inside align	DIMTIH	Off
Text offset	DIMGAP	1/16"
Text outside align	DIMTOH	Off
Text pos hor	DIMJUST	0
Text pos vert	DIMTAD	1

IBB IMPERIAL 1		
DESCRIPTION	VARIABLE	VALUE
Text prefix and suffix	DIMPOST	
Text style	DIMTXSTY	IBB Dimensions
Tol dev lower	DIMTM	0"
Tol dev upper	DIMTP	0"
Tol deviation	DIMTOL	Off
Tol limits	DIMLIM	Off
Tol pos vert	DIMTOLJ	1
Tol precision	DIMTDEC	2
Tol text scale factor	DIMTFAC	0.75
Tol zero suppression	DIMTZIN	0
Zero suppression	DIMZIN	3

IBB METRIC 1		
DESCRIPTION	VARIABLE	VALUE
Alt precision	DIMALTD	2
Alt prefix and suffix	DIMAPOST	
Alt roundoff	DIMALTRND	0"
Alt scale factor	DIMALTF	25.4
Alt tol precision	DIMALTTD	2
Alt tol zeroes	DIMALTTZ	0
Alt units	DIMALTU	2
Alt zeroes	DIMALTZ	0
Alternate units	DIMALT	Off
Angle format	DIMAUNIT	0
Angle precision	DIMADEC	1
Angle zero suppression	DIMAZIN	0
Arrow	DIMBLK	ClosedFilled
Arrow 1	DIMBLK1	ArchTick
Arrow 2	DIMBLK2	ArchTick
Arrow size	DIMASZ	2.5
Center mark size	DIMCEN	2.5
Decimal separator	DIMDSEP	.
Dim line LW	DIMLWD	-2
Dim line color	DIMCLRD	BYBLOCK
Dim line ext	DIMDLE	2
Dim line forced	DIMTOFL	On
Dim line spacing	DIMDLI	8
Ext line LW	DIMLWE	-2
Ext line color	DIMCLRE	BYBLOCK
Ext line extension	DIMEXE	2
Ext line offset	DIMEXO	2
Fit: arrow and text	DIMATFIT	3
Fit: text movement	DIMTMOVE	2
Fraction format	DIMFRAC	1
Leader arrow	DIMLDRBLK	ClosedFilled
Length scale	DIMLFAC	1
Length units	DIMLUNIT	2
No dim line 1	DIMSD1	Off
No dim line 2	DIMSD2	Off
No dim lines outside	DIMSOXD	Off
No ext line 1	DIMSE1	Off
No ext line 2	DIMSE2	Off
Precision	DIMDEC	0
Roundoff	DIMRND	0
Separate arrows	DIMSAH	On
Text color	DIMCLRT	BYBLOCK

IBB METRIC 1		
DESCRIPTION	VARIABLE	VALUE
Text height	DIMTXT	2.5
Text inside	DIMTIX	On
Text inside align	DIMTIH	Off
Text offset	DIMGAP	1
Text outside align	DIMTOH	Off
Text pos hor	DIMJUST	0
Text pos vert	DIMTAD	1
Text prefix and suffix	DIMPOST	mm
Text style	DIMTXSTY	IBB Dimensions
Tol dev lower	DIMTM	0
Tol dev upper	DIMTP	0
Tol deviation	DIMTOL	Off
Tol limits	DIMLIM	Off
Tol pos vert	DIMTOLJ	1
Tol precision	DIMTDEC	0
Tol text scale factor	DIMTFAC	0.75
Tol zero suppression	DIMTZIN	0
Zero suppression	DIMZIN	3

PLOTTING AND LAYOUTS

Overview

The Standards drawing ("IBB Standards.dwg") contains the standard layouts. Layouts refer to the different Paper Spaces within a drawing. Layouts are individual plot sheets already defined with a page setup, a viewport showing entities in Model Space, and any layer configuration needed. Most plotting will take place from individual layouts, but it is possible to plot from Model Space if a check plot is needed.

Titleblocks

The standard titleblock drawing files reside in the X:\ CADD Standards \ Titleblocks directory on the network. The following is a list of those titleblocks:

TITLEBLOCKS		
DRAWING NAME	PAPER SIZE	ORIENTATION OR TYPE
IBB 8½x11 (Sketch).dwg	8 1/2 x 11 Portrait	Sketch
IBB 11x8½ (Sketch).dwg	8 1/2 x 11 Landscape	Sketch
IBB 17x11 (Sketch).dwg	11 x 17 Landscape	Sketch
IBB 17x11 (Horizontal).dwg	11 x 17 Landscape	Horizontal
IBB 17x11 (Vertical).dwg	11 x 17 Landscape	Vertical
IBB 24x18 (Horizontal).dwg	18 x 24 Landscape	Horizontal
IBB 24x18 (Vertical).dwg	18 x 24 Landscape	Vertical
IBB 36x24 (Horizontal).dwg	24 x 36 Landscape	Horizontal
IBB 36x24 (Vertical).dwg	24 x 36 Landscape	Vertical

Layouts

The Standards drawing ("IBB Standards.dwg") contains predefined layouts already set up to receive externally referenced project titleblocks. The layouts also contain viewports that are on a no plot layer and are set to an appropriate scale. The following is a list of those layouts along with the corresponding titleblocks that are to be externally referenced into them:

LAYOUTS			
NAME	PAPER SIZE	TITLEBLOCK XREF	VPOR SCALE
8½x11S (Blank)	Letter	IBB 8½x11 (Sketch)	Scaled to Fit
11x8½S (Blank)	Letter	IBB 11x8½ (Sketch)	Scaled to Fit
17x11S (Blank)	11x17	IBB 17x11 (Sketch)	1/8" = 1'-0"
17x11H	11x17	IBB 17x11 (Horizontal)	1/8" = 1'-0"
17x11V	11x17	IBB 17x11 (Vertical)	1/8" = 1'-0"
24x18H	18x24	IBB 24x18 (Horizontal)	1/8" = 1'-0"
24x18V	18x24	IBB 24x18 (Vertical)	1/8" = 1'-0"
36x24H	24x36	IBB 36x24 (Horizontal)	1/8" = 1'-0"
36x24V	24x36	IBB 36x24 (Vertical)	1/8" = 1'-0"



















































Plot Style Tables





















Plot Style Tables define how entities in AutoCAD plot – they are the pen settings. IBB uses several different Plot style tables depending on the scale of the drawing. The following is a list of those Plot Style Tables and their descriptions:

PLOT STYLE TABLES	
NAME	DESCRIPTION
IBB - Large Format.ctb	For plotting large format (1/8", 1/16", site plans, etc.) drawings
IBB - Large Format (existing plots greyed).ctb	Same as above, except existing layers plot 70% grey instead of black
IBB - Small Format.ctb	For plotting small format (1/4", 1/2", etc.) drawings
IBB - Small Format (existing plots greyed).ctb	Same as above, except existing layers plot 70% grey instead of black
Monochrome.ctb	Plots everything black with the layer lineweights

Since AutoCAD entities plot depending on their color, it is important to use the correct color settings. The standard set of layers already have predetermined colors assigned based on how they plot. See the section named "Layering" for more information.

For reference, the following lists the settings for the "IBB - Large Format.ctb" plot style table defining how AutoCAD colors will plot. The "IBB - Small Format.ctb" plot style table is the same except the lineweights are exactly half and the "existing plots greyed" versions cause the existing colors (14, 54, 94, 134, 174, 214) to plot as only 70% black:

IBB – LARGE FORMAT.CTB						
AUTOCAD COLOR	COLOR	LWT	SCREEN	DESCRIPTION		
 1 Red	Black	0.02 mm	100%	Extra Thin Lines		
 2 Yellow	Black	0.08 mm	100%	Thin Lines		
 3 Green	Black	0.14 mm	100%	Medium-Thin Lines		
 4 Cyan	Black	0.20 mm	100%	Medium-Thick Lines		
 5 Blue	Black	0.30 mm	100%	Thick Lines		
 6 Magenta	Black	0.50 mm	100%	Extra Thick Lines		
 7 White	Black	0.10 mm	100%	Annotation		
 8 -	Black	0.01 mm	90%	Primary Hatch		
 9 -	Black	0.01 mm	70%	Secondary Hatch		
 14 -	Black	0.02 mm	100%	Extra Thin Lines		
 54 -	Black	0.08 mm	100%	Thin Lines		
 94 -	Black	0.14 mm	100%	Medium-Thin Lines		
 134 -	Black	0.20 mm	100%	Medium-Thick Lines		
 174 -	Black	0.30 mm	100%	Thick Lines		
 214 -	Black	0.50 mm	100%	Extra Thick Lines		
 30 -	Black	0.01 mm	100%	Wrong Layer		
 243	N/A	0.00 mm	0%	Non-plotting Layer		
 250 -	Black	0.01 mm	100%	Black Shading		
 251 -	Black	0.01 mm	90%	Grey Shading		
 252 -	Black	0.01 mm	70%	Grey Shading		
 253 -	Black	0.01 mm	50%	Grey Shading		
 254 -	Black	0.01 mm	30%	Grey Shading		
 255 -	Black	0.01 mm	10%	Grey Shading		
 11 -	11	0.01 mm	100%	Solid Fills		
 21 -	21	0.01 mm	100%	Solid Fills		
 31 -	31	0.01 mm	100%	Solid Fills		
 41 -	41	0.01 mm	100%	Solid Fills		
 51 -	51	0.01 mm	100%	Solid Fills		
 61 -	61	0.01 mm	100%	Solid Fills		
 71 -	71	0.01 mm	100%	Solid Fills		
 81 -	81	0.01 mm	100%	Solid Fills		
 91 -	91	0.01 mm	100%	Solid Fills		
 101 -	101	0.01 mm	100%	Solid Fills		
 111 -	111	0.01 mm	100%	Solid Fills		
 121 -	121	0.01 mm	100%	Solid Fills		
 131 -	131	0.01 mm	100%	Solid Fills		
 141 -	141	0.01 mm	100%	Solid Fills		
 151 -	151	0.01 mm	100%	Solid Fills		
 161 -	161	0.01 mm	100%	Solid Fills		
 171 -	171	0.01 mm	100%	Solid Fills		
 181 -	181	0.01 mm	100%	Solid Fills		
 191 -	191	0.01 mm	100%	Solid Fills		
 201 -	201	0.01 mm	100%	Solid Fills		
 211 -	211	0.01 mm	100%	Solid Fills		
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 231 -	231	0.01 mm	100%	Solid Fills		
 241 -	241	0.01 mm	100%	Solid Fills		
 12 -	12	0.01 mm	100%	Poche		
 22 -	22	0.01 mm	100%	Poche		
 32 -	32	0.01 mm	100%	Poche		
42 -	42	0.01 mm	100%	Poche		

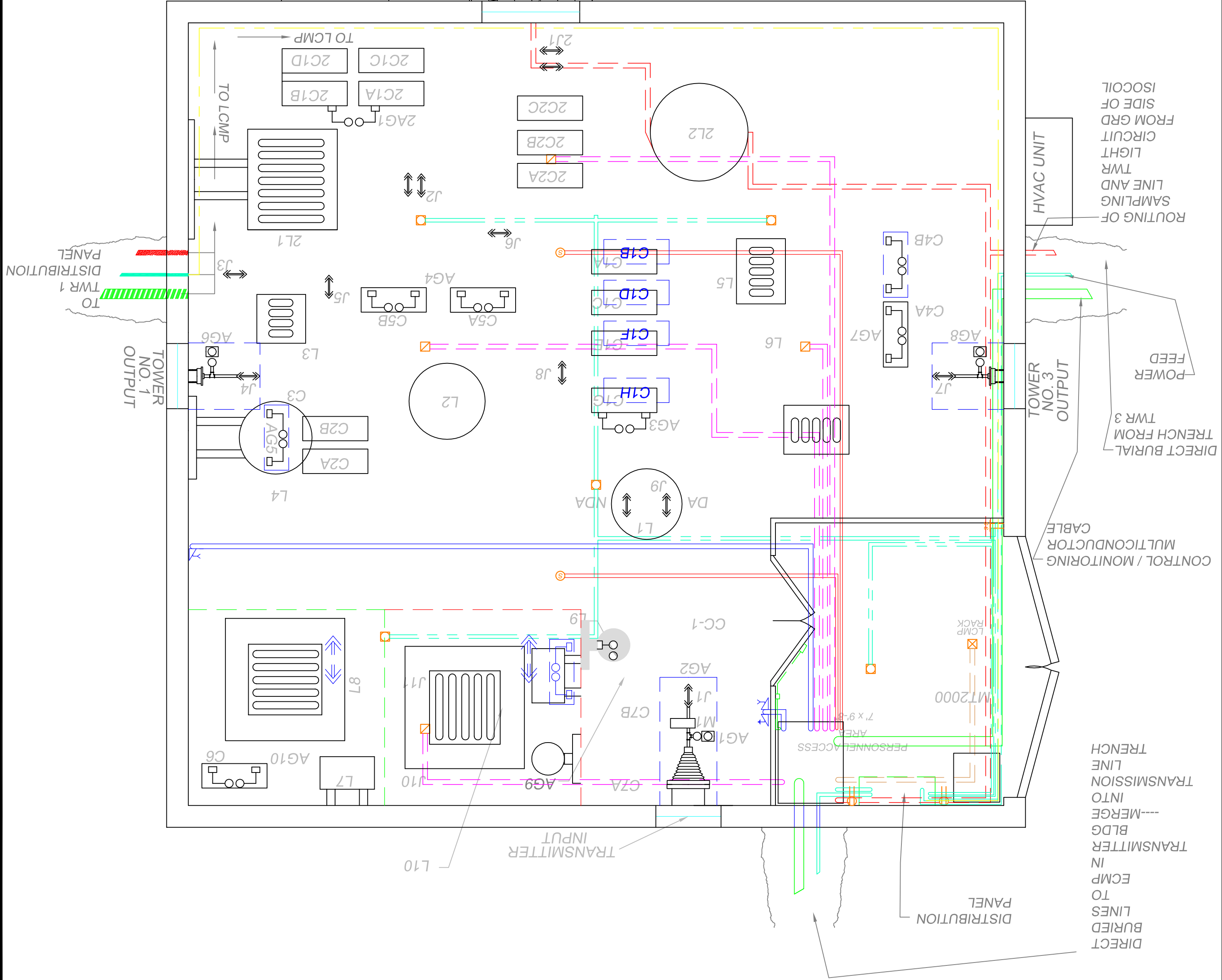
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	92	-	92	0.01 mm	100%	Poche
	102	-	102	0.01 mm	100%	Poche
	112	-	112	0.01 mm	100%	Poche
	122	-	122	0.01 mm	100%	Poche
	132	-	132	0.01 mm	100%	Poche
	142	-	142	0.01 mm	100%	Poche
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	162	-	162	0.01 mm	100%	Poche
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	192	-	192	0.01 mm	100%	Poche
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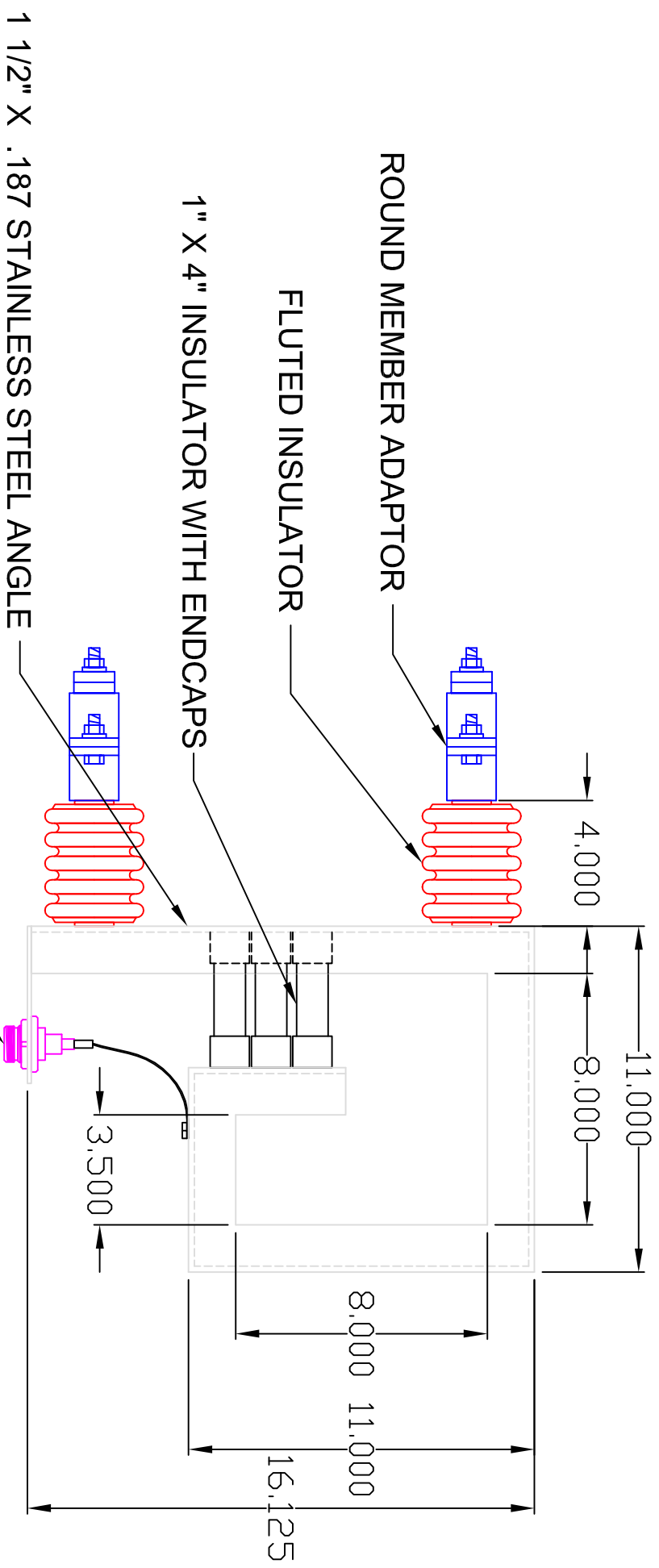
KINTRONIC LABORATORIES INC. BLUFF CITY, TN.		KUALAT CENTRAL TUNING HOUSE POWER / SECURITY FEED LAYOUT	
REF DWG:	JOB NO:	DESIGNED:	APPROVED:
REV:	(4)1/4/08	TK	SCD
DWG NO:	11/19/07	DATE:	N.T.S.
A-5736			

CENTRAL TUNING HOUSE

** ALL DECTECTORS /
ALARMS ARE LOCATED
ON THE CEILING

- KEY:
- AC COMPONENT CONDUIT FEED
 - SMOKE / FIRE CONDUIT FEED
 - ARC DETECTION CONDUIT FEED
 - SAMPLE LINE CONDUIT FEED
 - DOOR INTERLOCK CONDUIT FEED
 - GROUND WAND CONDUIT FEED
 - MAIN POWER CONDUIT FEED
 - INTRUDER DETECTION CONDUIT FEED
 - DUPLEX RECEPTACLE
 - ARC DETECTOR
 - INTRUSION DETECTOR
 - SMOKE DETECTOR
 - RECESSED LIGHTING FIXTURE
 - HOLDER W/LEAD END BOLTED TO
 - GRD WAND IN INTERLOCKED
 - RF GRD
 - GRD WAND IN INTERLOCKED
 - HOLDER W/CLIP LEAD

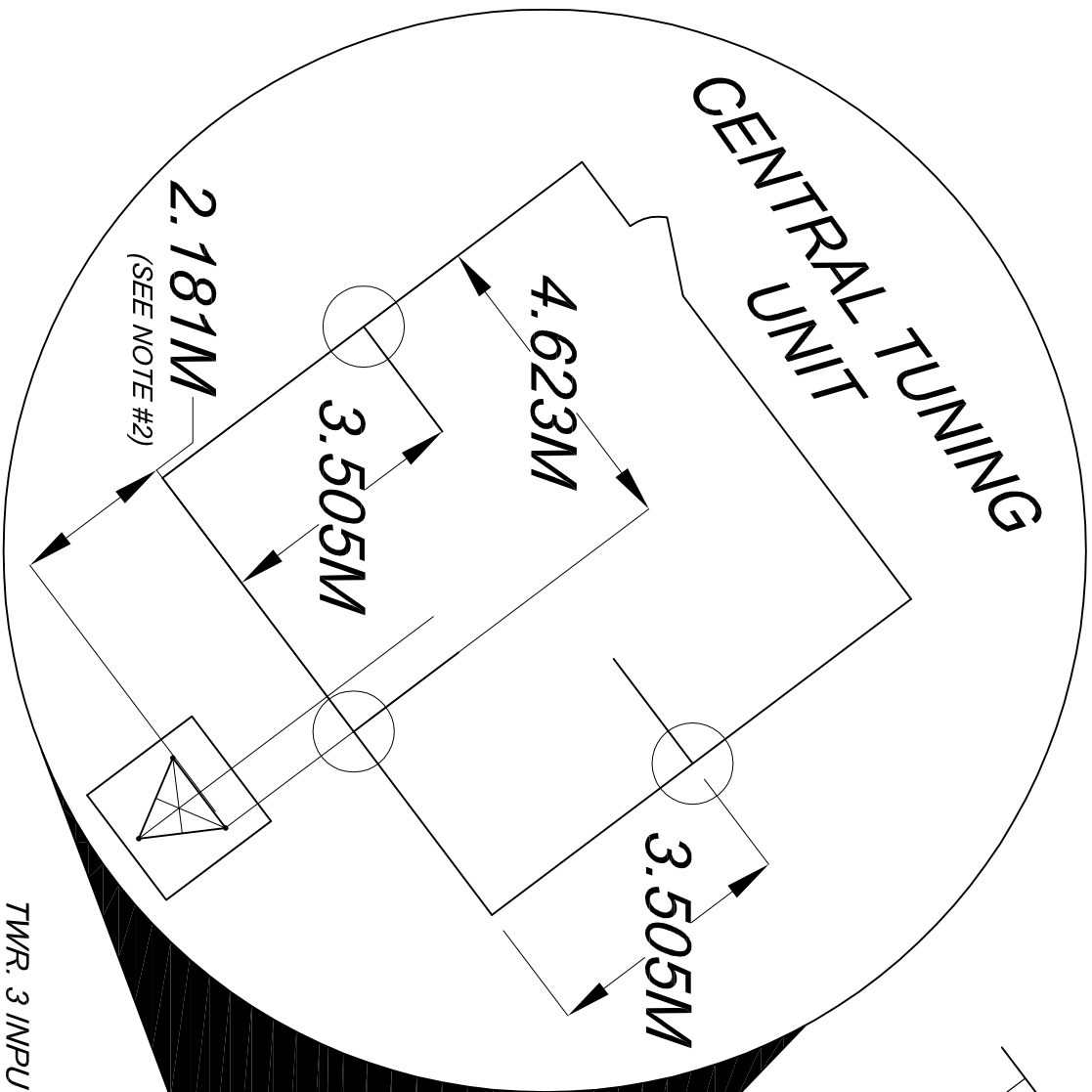
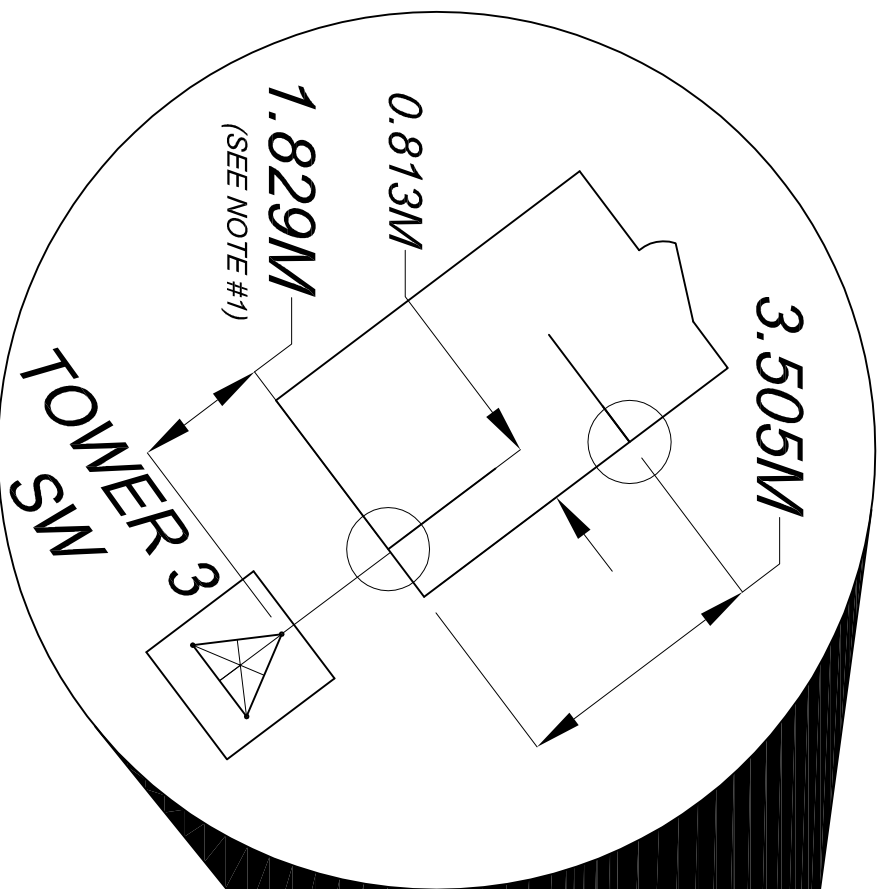




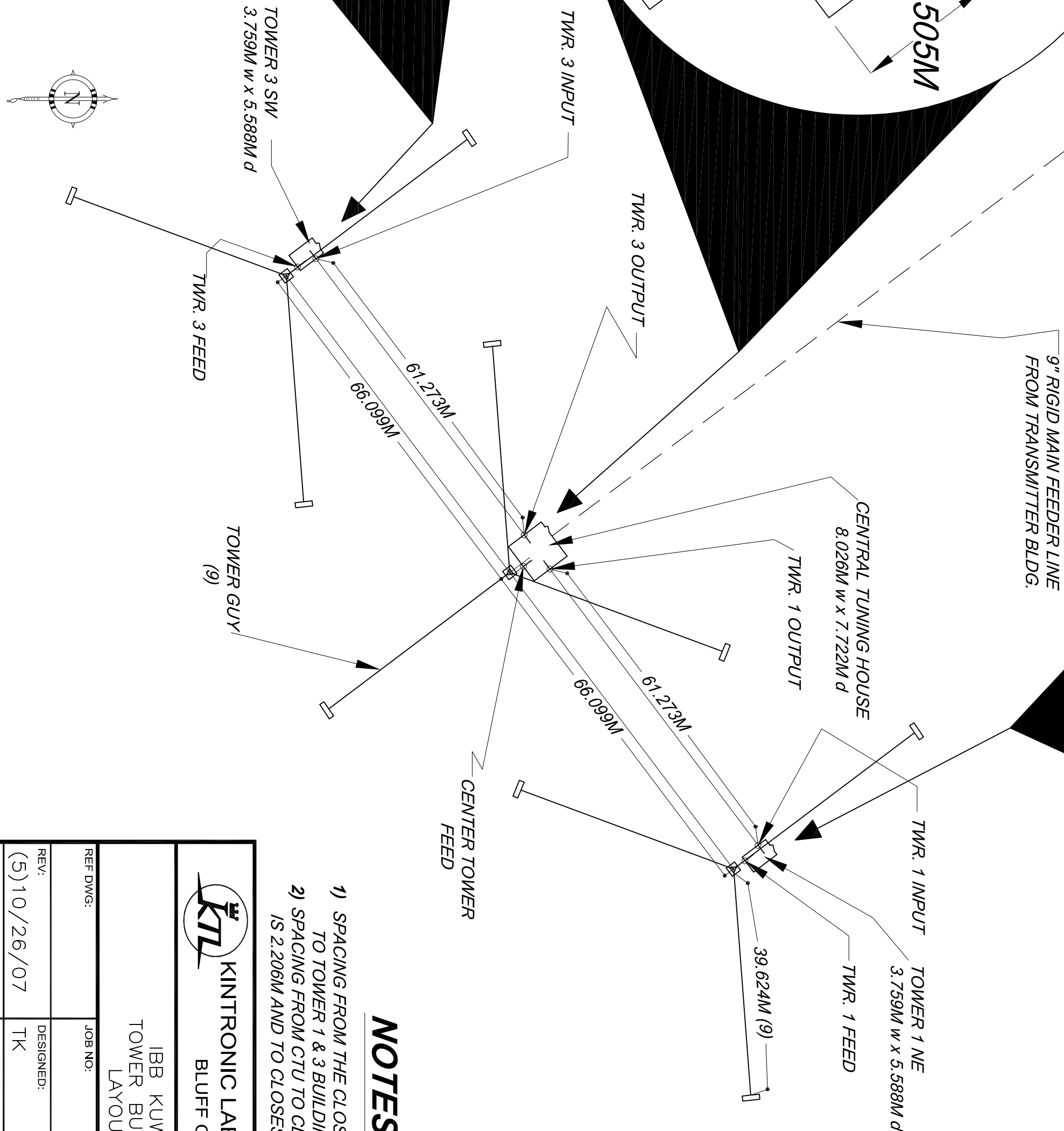
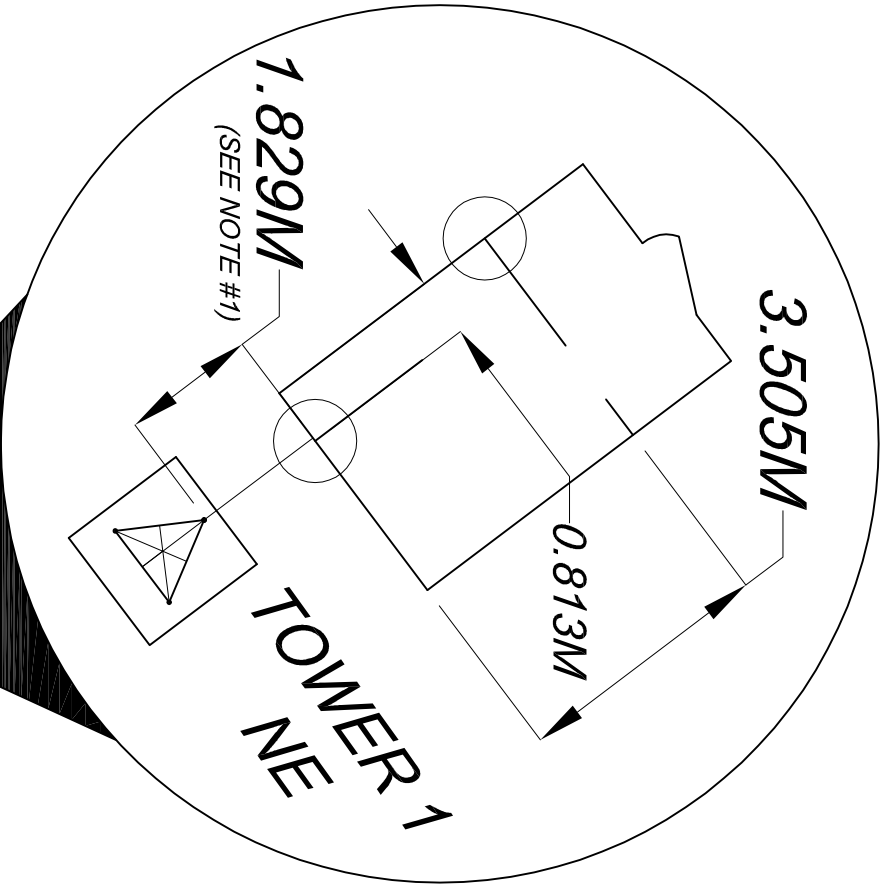
KINTRONIC LABORATORIES INC.
BLUFF CITY, TN.

IBB/KUWAIT
SAMPLING LOOP ASSEMBLY

REF DWG:	JOB NO:	DRAWN:
REV:	DESIGNED:	B. MILLER
DWG NO:	DATE:	SCALE:
A-5697A	12/10/07	NTS



TRANSMITTER BLDG.



NOTES:

- 1) SPACING FROM THE CLOSEST TOWER LEG TO TOWER 1 & 3 BUILDINGS IS 1.829M
- 2) SPACING FROM CTU TO CLOSEST TOWER FACE IS 2.206M AND TO CLOSEST TOWER LEG IS 2.181M

KTL KINTRONIC LABORATORIES INC.
BLUFF CITY, TN.

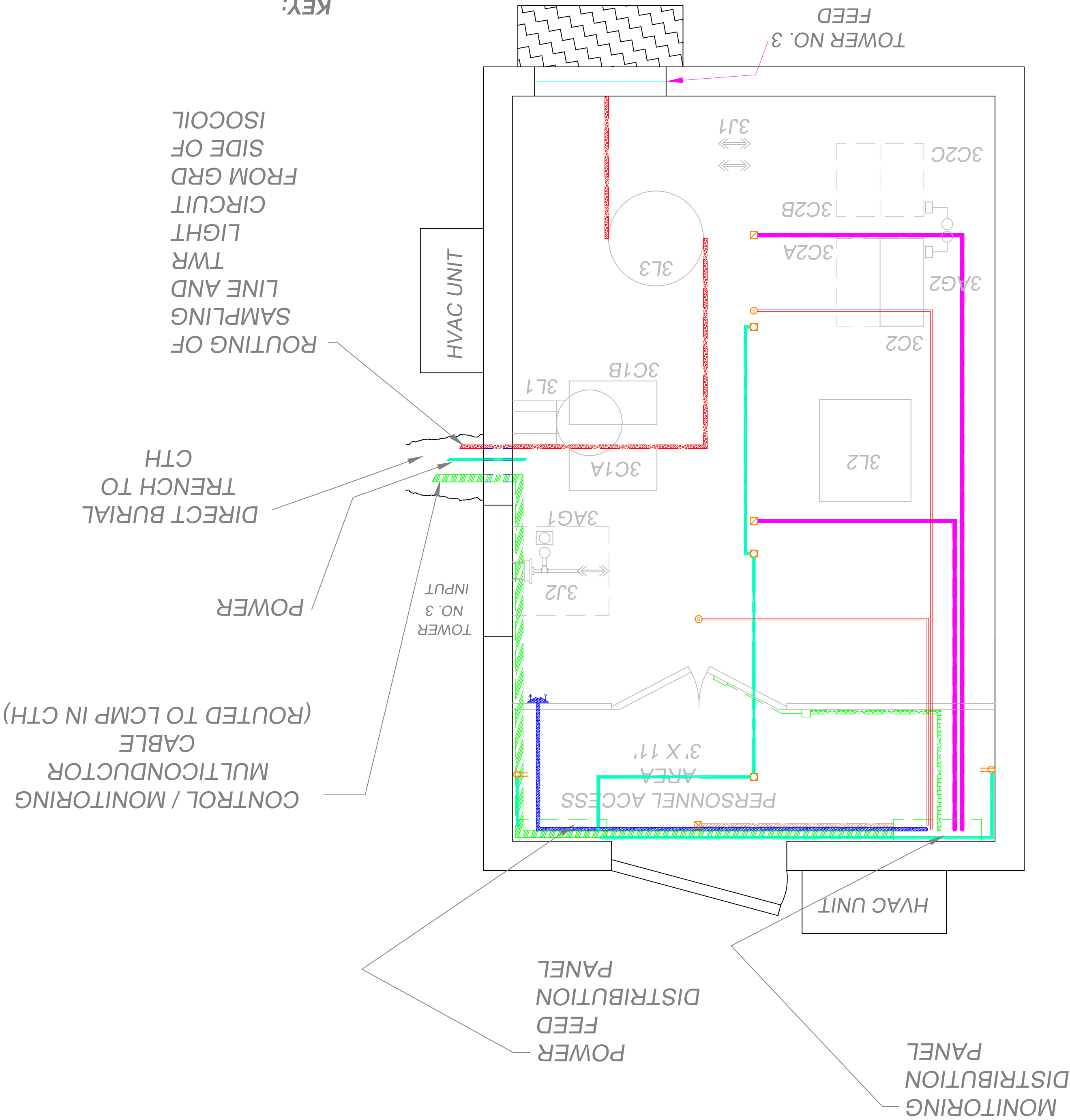
IBB KUWAIT
TOWER BUILDING
LAYOUT

REF DWG:	JOB NO:	DRAWN:
REV:	DESIGNED:	APPROVED:
(5) 10/26/07	TK	
DWG NO:	DATE:	SCALE:
A-5590-1	10/04/07	N.T.S.

KINTRONIC LABORATORIES INC. BLUFF CITY, TN.		TOWER NO. 3 SW POWER / SECURITY FEED LAYOUT	
REF DWG:	JOB NO:	DRAWN:	SCD
REV:	(4)1/4/08	DESIGNED:	TK
DWG NO:	A-5736-1	DATE:	11/19/07
SCALE:	N.T.S.		

**** ALL DETECTORS /
ALARMS ARE LOCATED
ON THE CEILING**

TOWER NO. 3 SW



- KEY:**
- DUPLEX RECEPTACLE
 - ☒ ARC DETECTOR
 - ☒ INTRUSION DETECTOR
 - ⊙ SMOKE DETECTOR
 - RECESSED LIGHTING FIXTURE
 - ↗ GRD WAND IN INTERLOCKED
HOLDER W/LEAD END BOLTED TO
RF GRD
 - ↖ GRD WAND IN INTERLOCKED
HOLDER W/CLIP LEAD
 - AC COMPONENT CONDUIT FEED
 - SMOKE / FIRE CONDUIT FEED
 - ARC DETECTION CONDUIT FEED
 - SAMPLE LINE CONDUIT FEED
 - DOOR INTERLOCK CONDUIT FEED
 - GROUND WAND CONDUIT FEED
 - MAIN POWER CONDUIT FEED
 - INTRUDER DETECTION CONDUIT
FEED

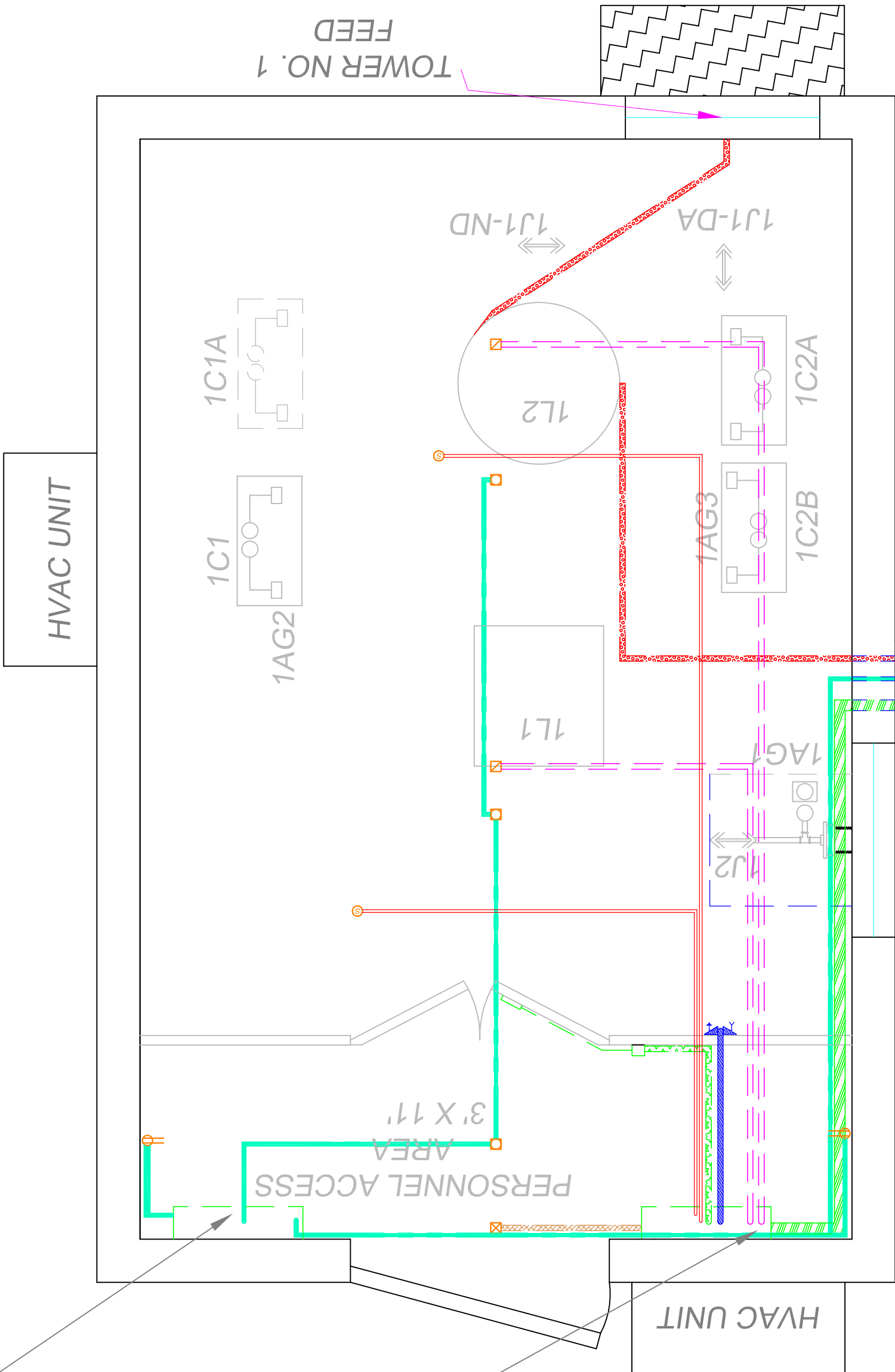
KINTRONIC LABORATORIES INC. BLUFF CITY, TN.	
KUWAIT TOWER NO. 1 NE POWER / SECURITY FEED LAYOUT	
REF DWG:	JOB NO:
REV:	DESIGNED:
(4)1/4/08	TK
DATE:	11/19/07
DWG NO:	A-5736-2
SCALE:	N.T.S.

** ALL DETECTORS /
ALARMS ARE LOCATED
ON THE CEILING

TOWER NO. 1 NE

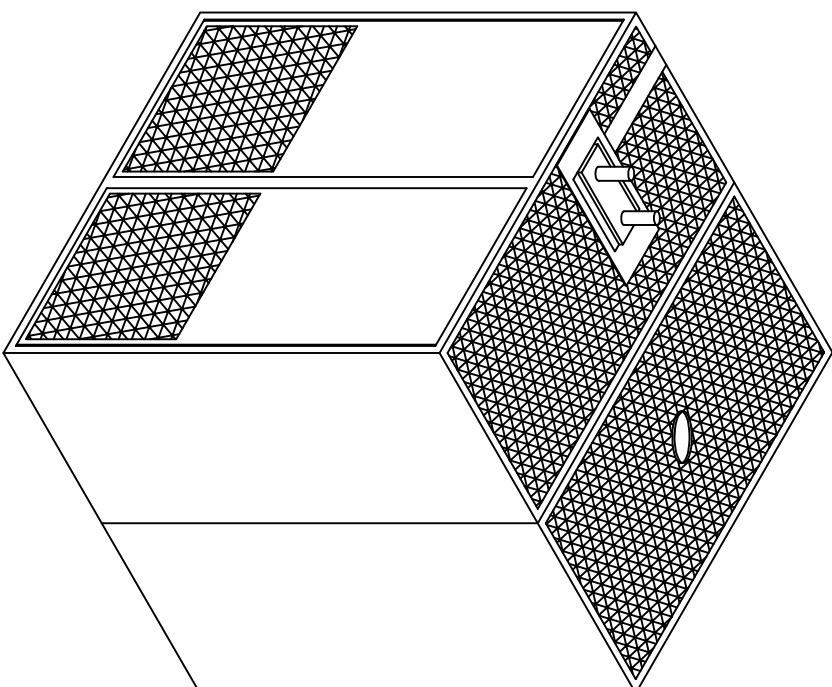
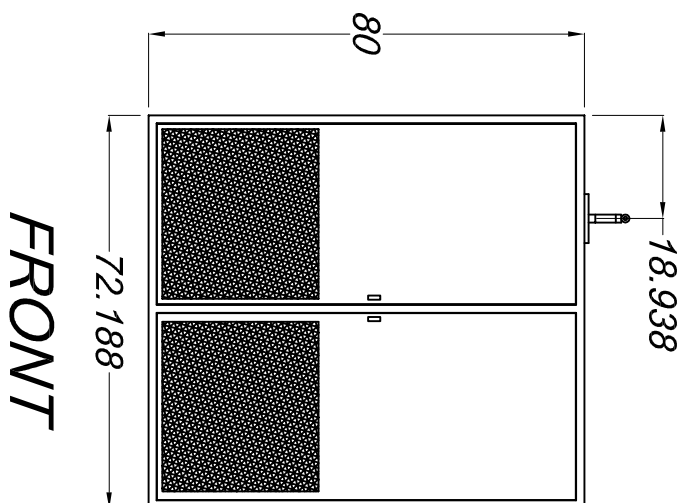
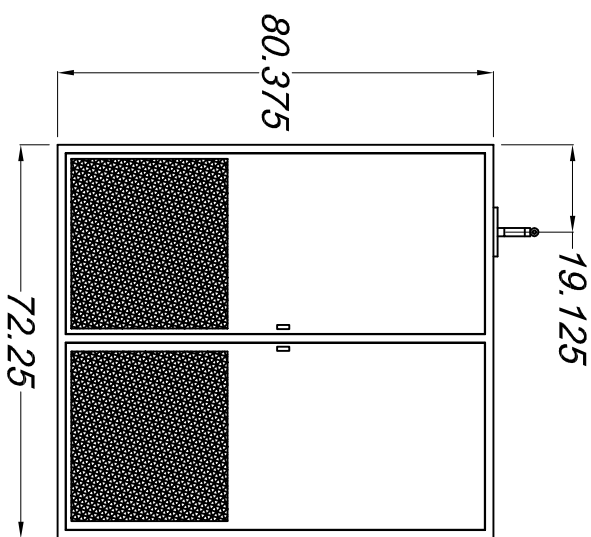
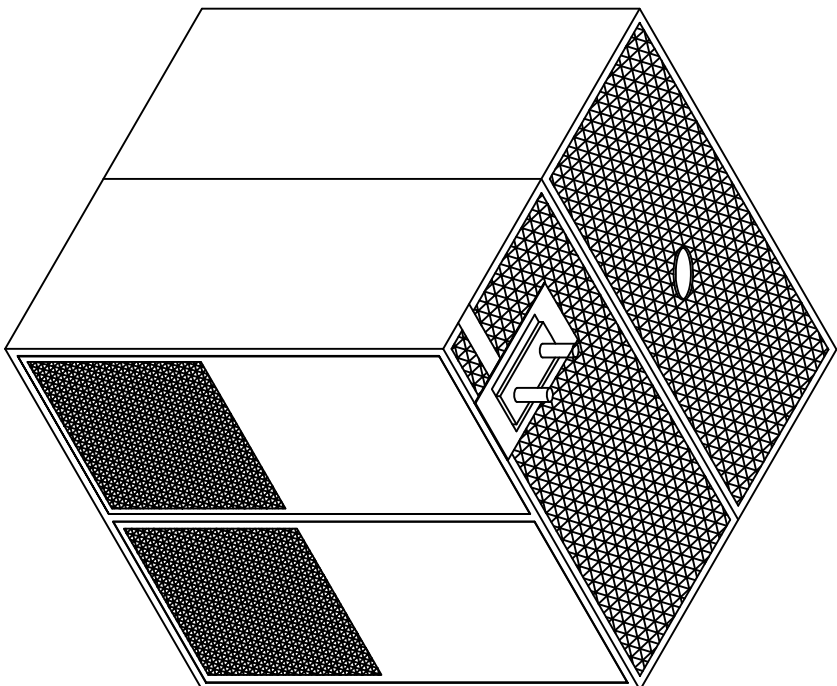
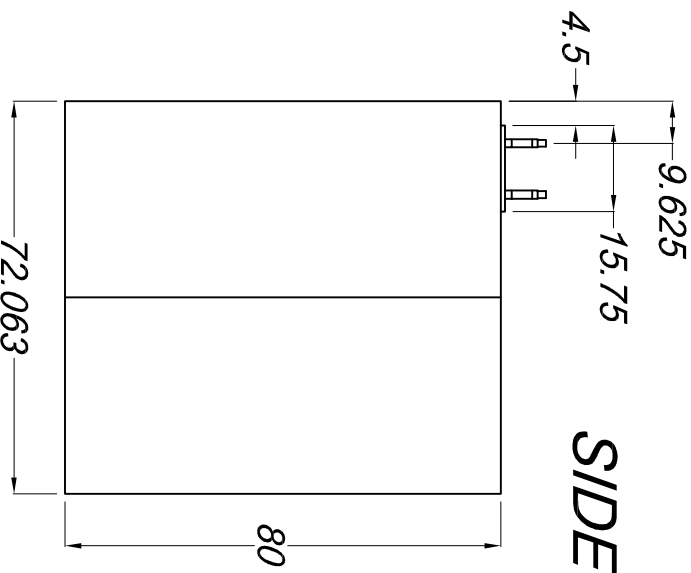
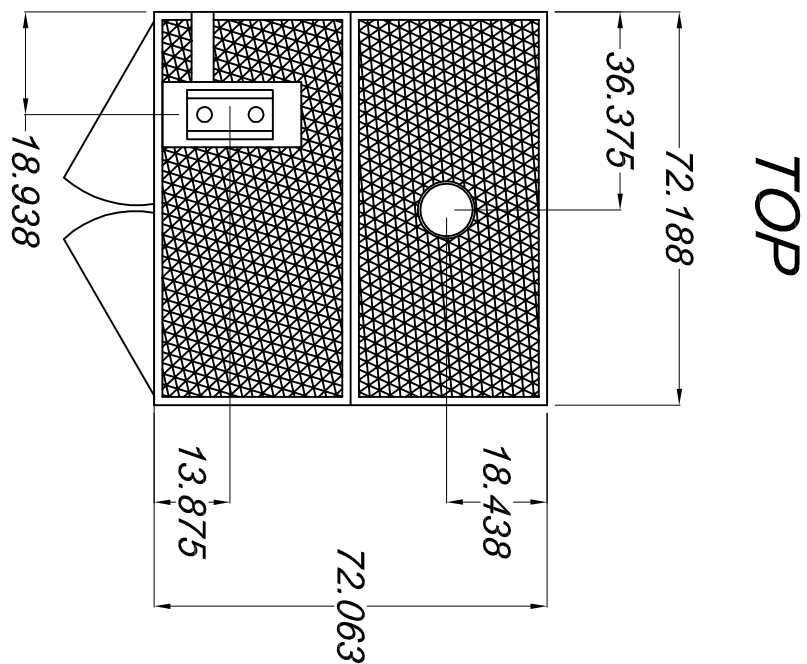
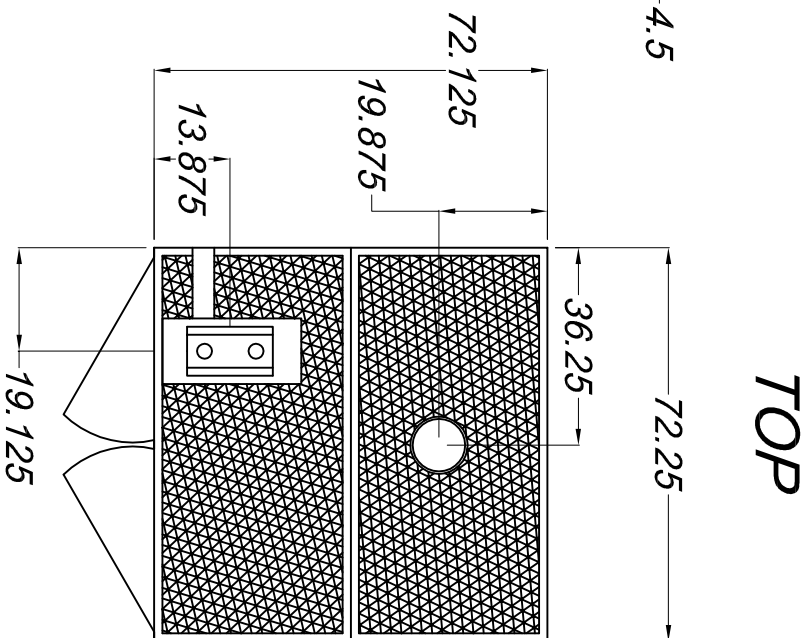
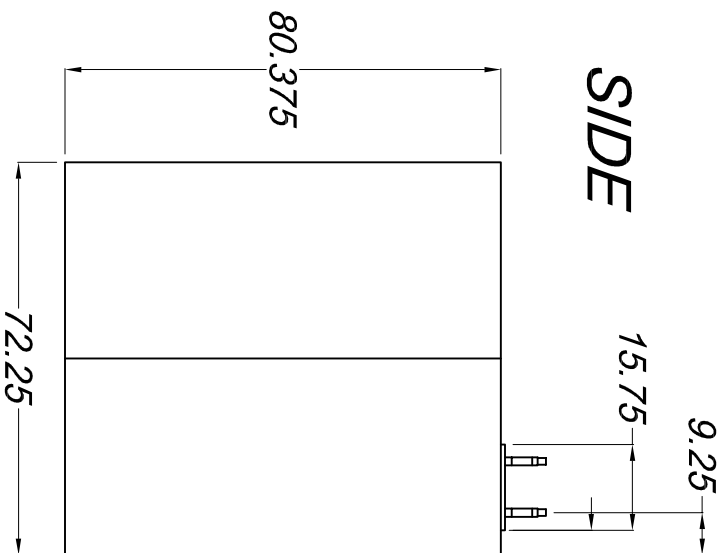
- KEY:
- DUPLEX RECEPTACLE
 - ARC DETECTOR
 - INTRUSION DETECTOR
 - SMOKE DETECTOR
 - RECESSED LIGHTING FIXTURE
 - GRD WAND IN INTERLOCKED
 - HOLDER W/LEAD END BOLTED TO
 - RF GRD
 - GRD WAND IN INTERLOCKED
 - AC COMPONENT CONDUIT FEED
 - SMOKE / FIRE CONDUIT FEED
 - ARC DETECTION CONDUIT FEED
 - SAMPLE LINE CONDUIT FEED
 - DOOR INTERLOCK CONDUIT FEED
 - GROUND WAND CONDUIT FEED
 - MAIN POWER CONDUIT FEED
 - INTRUDER DETECTION CONDUIT
 - FEED

CONTROL / MONITORING
CABLE
(ROUTED TO LCMF IN CTH)
DIRECT BURIAL
TRENCH TO
CTH
ROUTING OF
TWR
LINE AND
LIGHT
CIRCUIT
FROM GRD
SIDE OF
ISOCOIL



POWER
FEED
DISTRIBUTION
PANEL

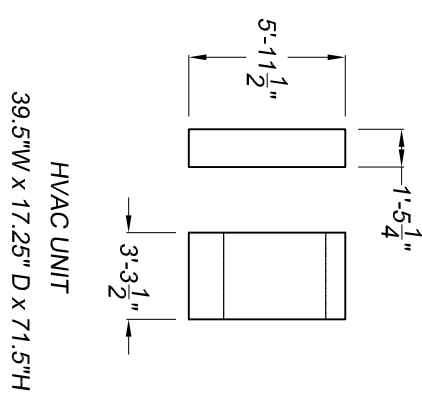
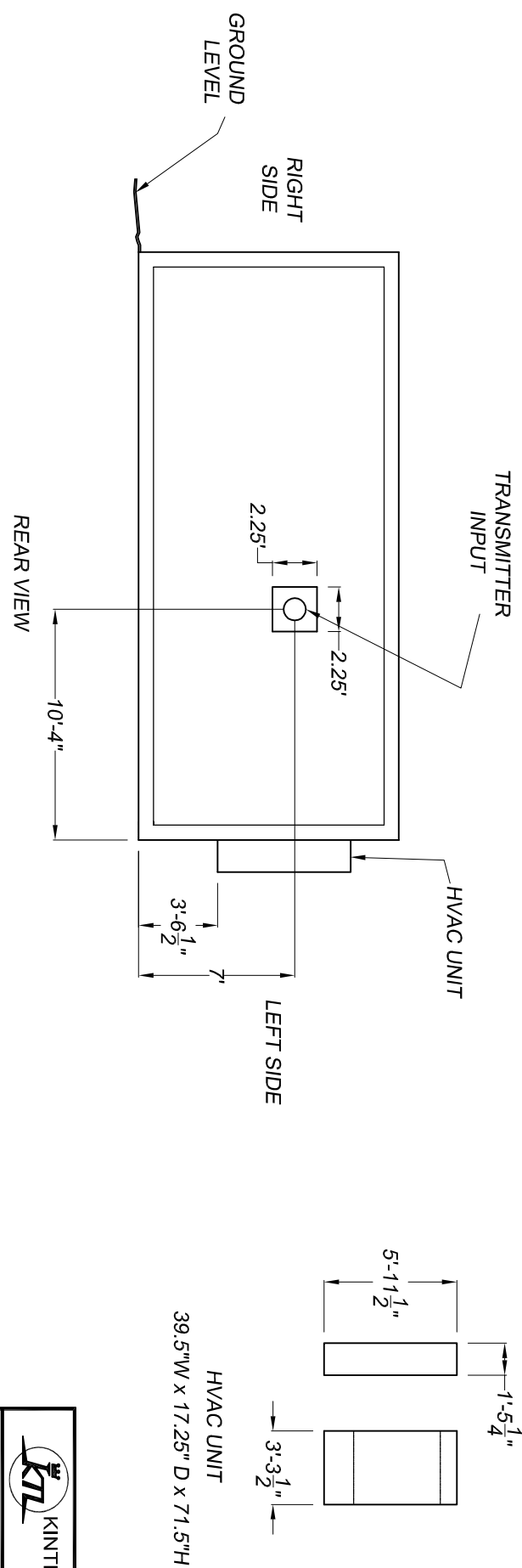
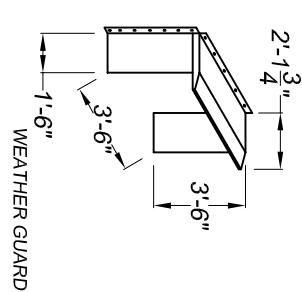
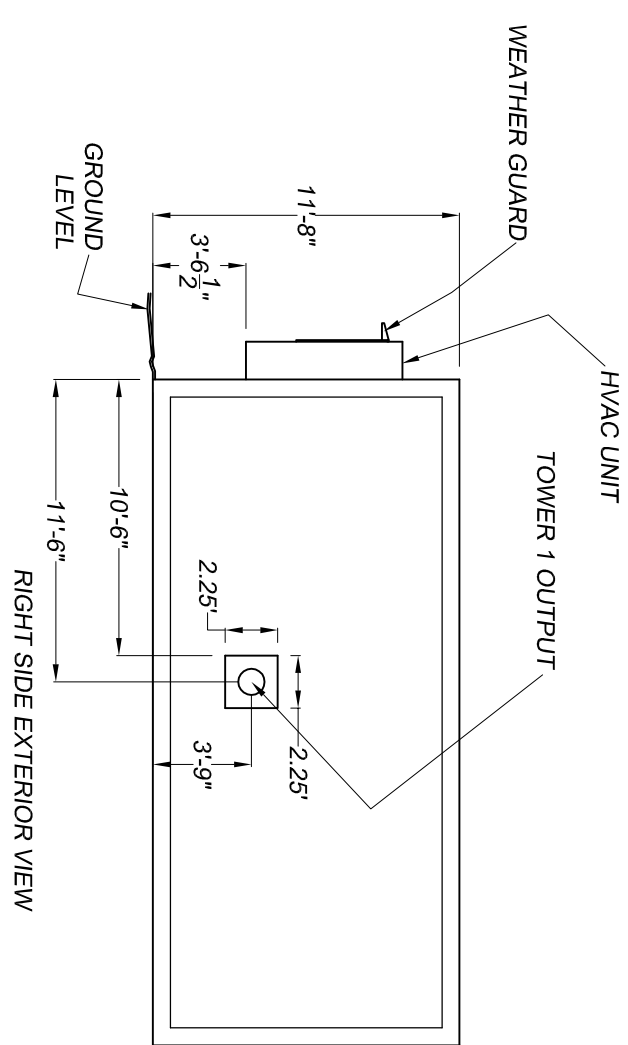
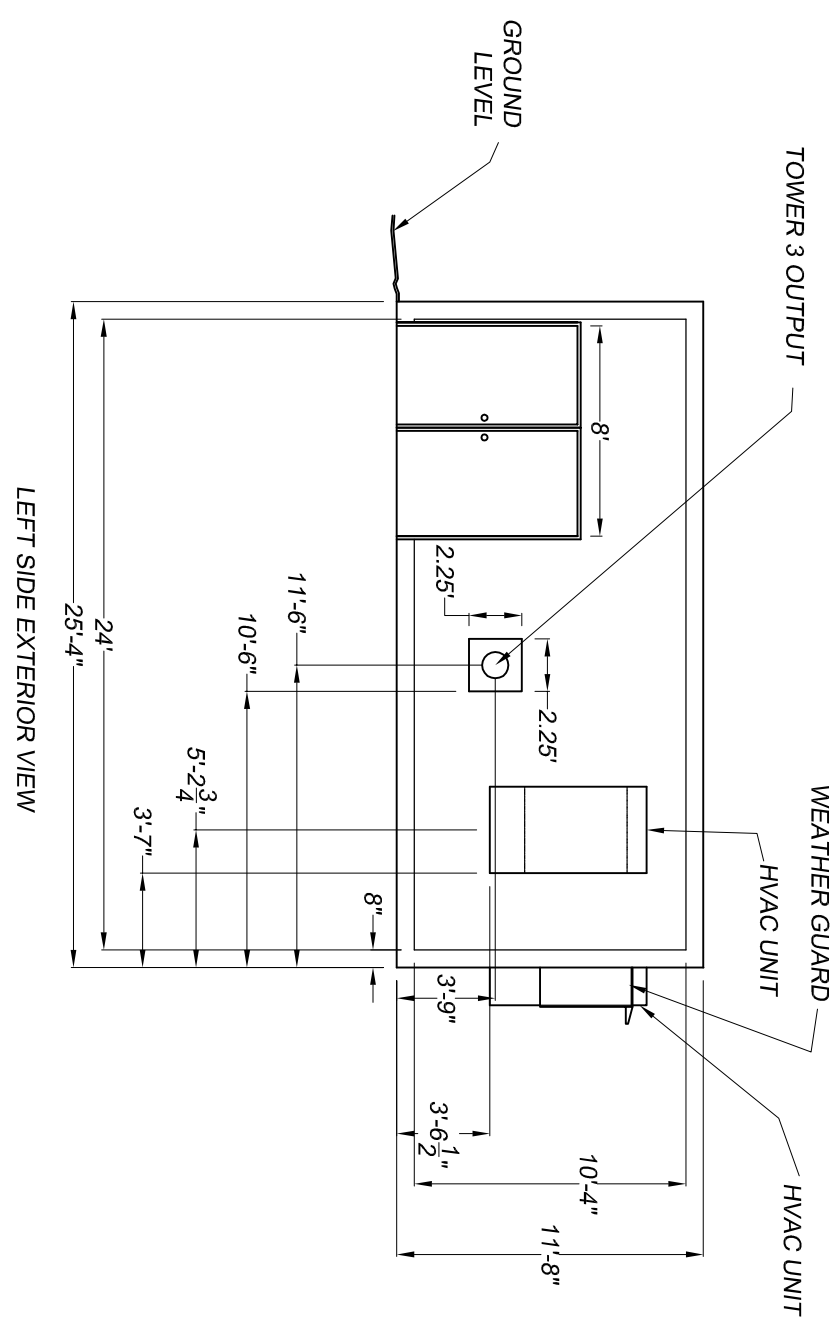
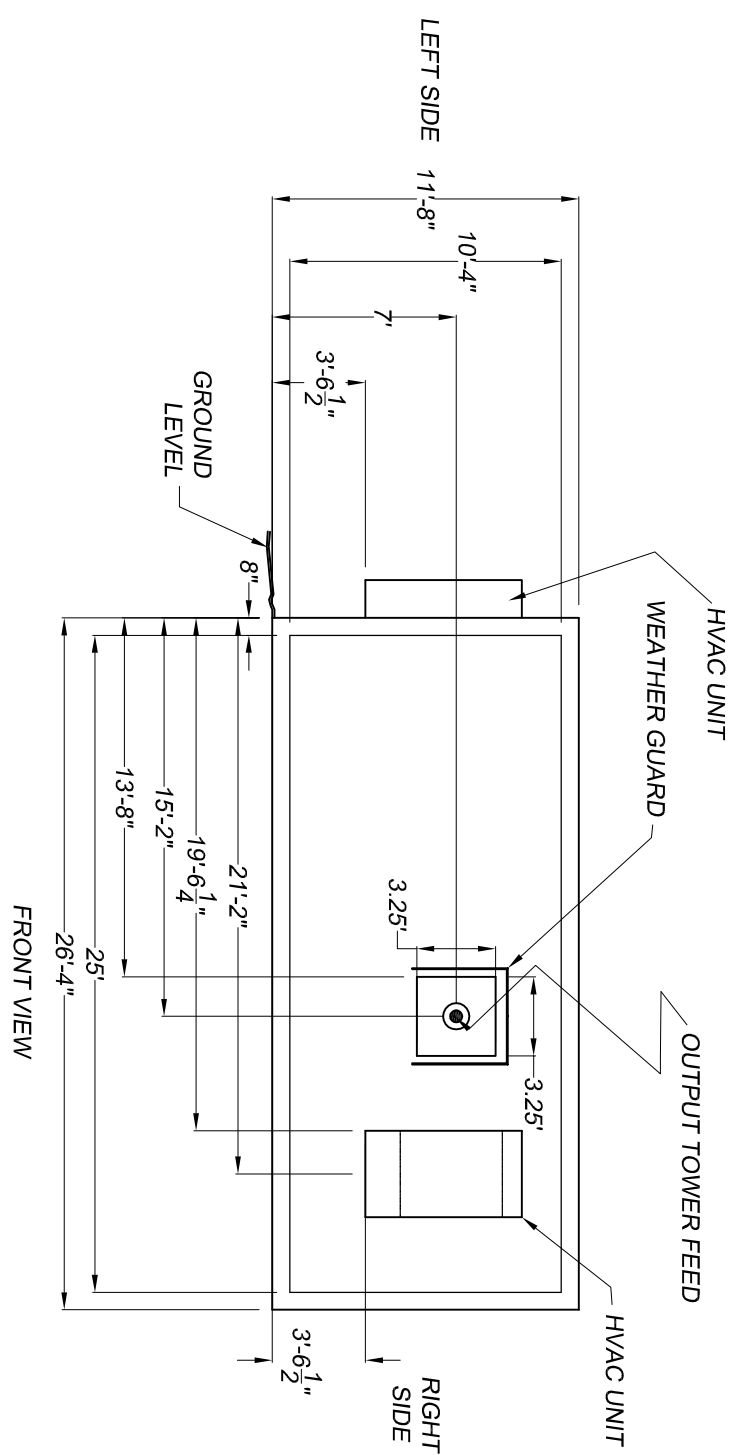
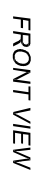
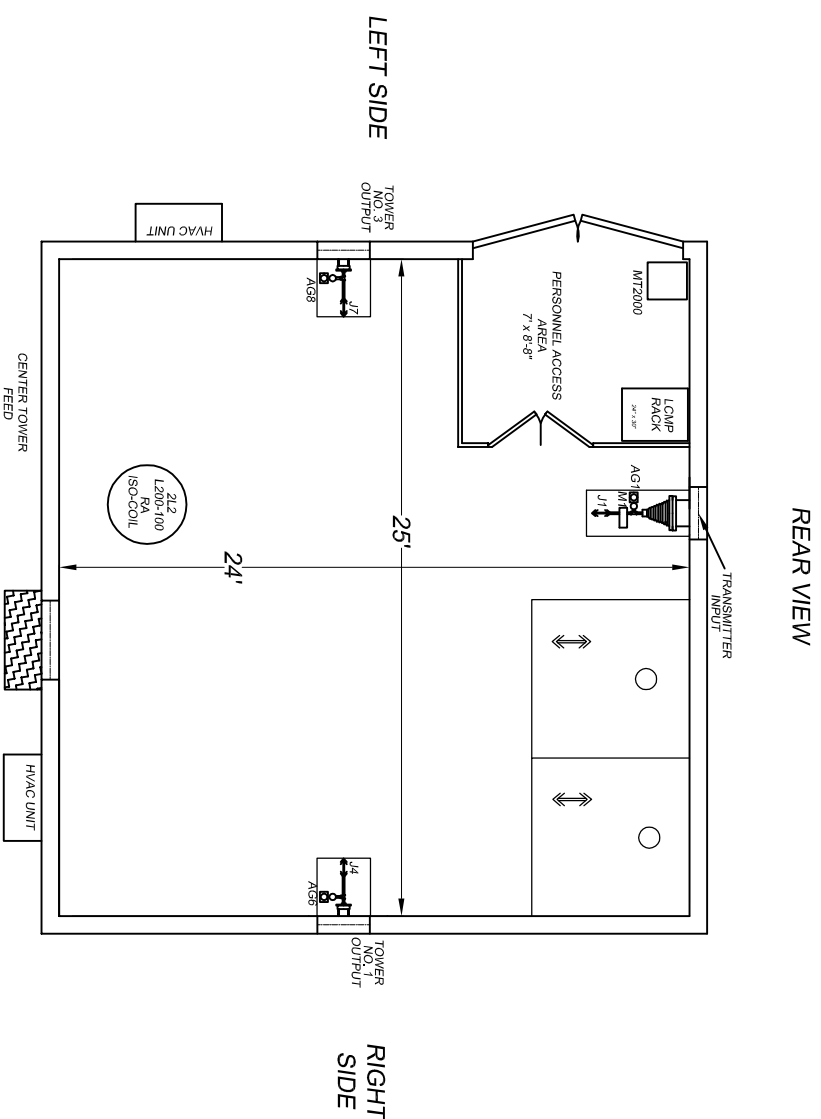
MONITORING
DISTRIBUTION
PANEL




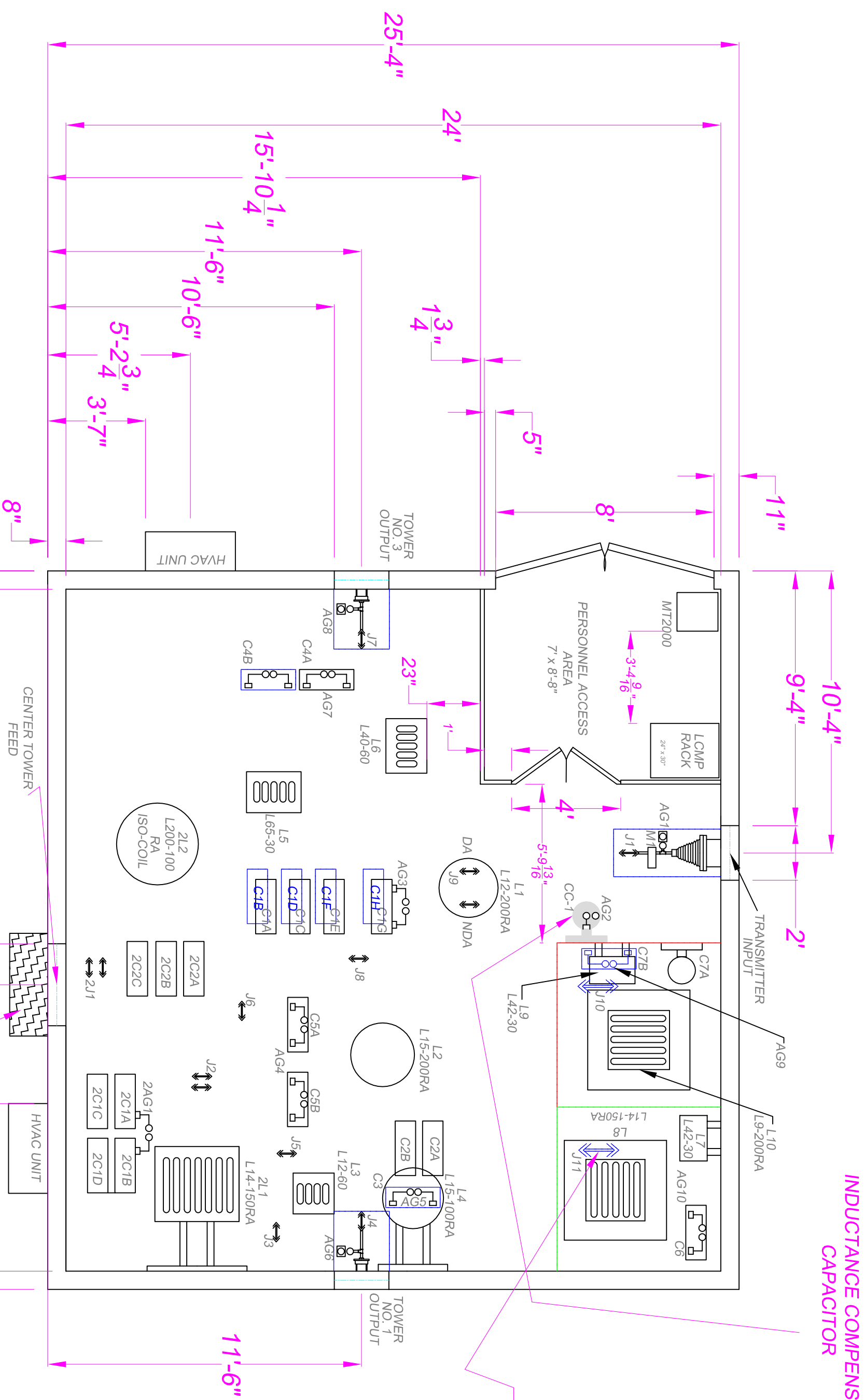
 KINTRONIC LABORATORIES INC.
BLUFF CITY, TN.

IBB KUWAIT
CTH FILTER HOUSING
LAYOUT/DETAIL

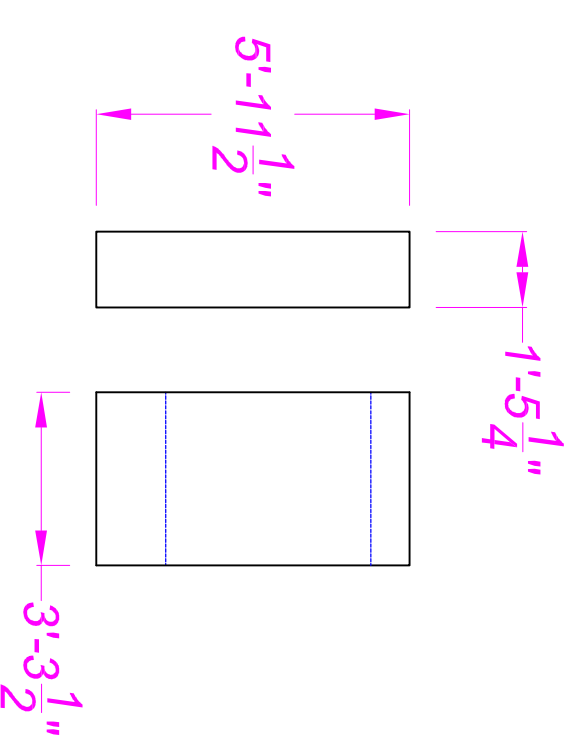
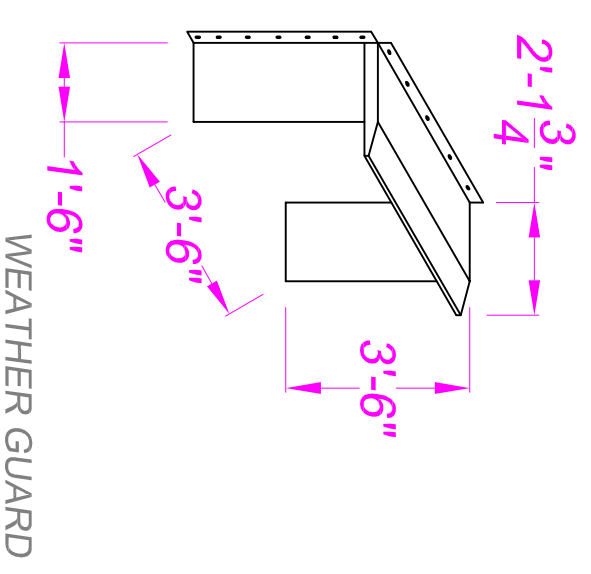
REF DWG:	JOB NO:	DRAWN:
REV:	DESIGNED:	SCD
DWG NO:	DATE:	APPROVED:
A-5756	12/27/07	N.T.S.



 KINTRONIC LABORATORIES INC. BLUFF CITY, TN.		
CENTRAL TUNING HOUSE PROPOSAL BUILDING/PORT ELEVATION IBB KUWAIT		
REF. DWG.	JOB NO.	DRAWING NO.
ISS. NO.	DESIGNED BY	APPROVED BY
(3) 12/27/07	TK	
DWG. NO.	DATE	SCALE
A-5592-1	4/11/07	N.T.S.



—J10 & J11
ARE MOUNTED
ON TOP OF FILTER
BOXES



KUWAIT
CENTRAL TUNING HOUSE
BUILDING LAYOUT

REF. DWG:	JOB NO.:	DRAWN:
REV:	DESIGNED:	SCD
(8) 12/27/07	TK	APPROVED:
DWG NO.:	DATE:	SCALE:
A-5587-2	3/29/07	N.T.S.

CENTRAL TUNING HOUSE



KINTRONIC LABS

P.O. BOX 845 BRISTOL, TN 37621-0845 Email: ktl@kintronic.com
1-423-878-3141 FAX: 1-423-878-4224

January 17, 2008

IBB Kuwait Tower Building Material List

Central Tuning House

Ground Wand:

<u>ITEM QTY:</u>	<u>MATERIAL:</u>
3	Wand
2	EMT Connectors
6	Elbows (90deg)
15	Lugs
1	EMT Union Coupling
3	Alligator Clips
130'	Wire (#12 or #14 Gauge)(Double Count)
6	½" x 10' Conduit

Intrusion Detector

<u>ITEM QTY:</u>	<u>MATERIAL:</u>
1	Detector
2	EMT Connectors
2	Elbows (90deg)
20'	Wire (#12 or #14 Gauge)(Single Count)
2	½" x 10' Conduit



KINTRONIC LABS

P.O. BOX 845 BRISTOL, TN 37621-0845 Email: ktl@kintronic.com
1-423-878-3141 FAX: 1-423-878-4224

Arc Detectors

ITEM QTY:

MATERIAL:

4	Detectors
8	EMT Connectors
10	Elbows (90deg)
3	EMT Union Coupling
25', 35', 25', 35'	Wire (#12 or #14 Gauge)(Single Count)
12	½" x 10' Conduit

Door Interlock

ITEM QTY:

MATERIAL:

1	Interlock Detector System
2	EMT Connectors
3	Elbows (90deg)
15'	Wire (#12 or #14 Gauge)(Single Count)
1	½" x 10' Conduit

AC Receptacles

ITEM QTY:

MATERIAL:

2	Receptacles (GFCI)
4	EMT Connectors
4	Elbows (90deg)
2	Electrical Boxes
15'	Wire (#12 or #14 Gauge)(Single Count)
2	¾" x 10' Conduit



KINTRONIC LABS

P.O. BOX 845 BRISTOL, TN 37621-0845 Email: ktl@kintronic.com
1-423-878-3141 FAX: 1-423-878-4224

Smoke Detectors

ITEM QTY:

MATERIAL:

2	Fire/Smoke Detectors
4	EMT Connectors
4	Elbows (90deg)
25', 35'	Wire (#12 or #14 Gauge)(Single Count)
6	½" x 10' Conduit

Data/Media Feed from XTMR

ITEM QTY:

MATERIAL:

1	EMT Connectors
3	Elbows (90deg)
25'	Cable (Single Count)
2	2" x 10' Conduit

Data/Media Feed from TWR 1

ITEM QTY:

MATERIAL:

1	EMT Connectors
6	Elbows (90deg)
6	EMT Union Coupling
125'	Cable (Single Count)
9	2" x 10' Conduit



KINTRONIC LABS

P.O. BOX 845 BRISTOL, TN 37621-0845 Email: ktl@kintronic.com
1-423-878-3141 FAX: 1-423-878-4224

Data/Media Feed from TWR 3

ITEM QTY:

MATERIAL:

1	EMT Connectors
4	Elbows (90deg)
2	EMT Union Coupling
45'	Cable (Single Count)
5	2" x 10' Conduit

AC TWR 3 Feed

ITEM QTY:

MATERIAL:

1	EMT Connectors
4	Elbows (90deg)
2	EMT Union Coupling
50'	Wire (#12 or #14 Gauge) (Single Count)
5	3/4" x 10' Conduit

AC TWR 1 Feed

ITEM QTY:

MATERIAL:

1	EMT Connectors
6	Elbows (90deg)
6	EMT Union Coupling
100'	Wire (#12 or #14 Gauge) (Single Count)
9	3/4" x 10' Conduit



KINTRONIC LABS

P.O. BOX 845 BRISTOL, TN 37621-0845 Email: ktl@kintronic.com
1-423-878-3141 FAX: 1-423-878-4224

AC Feed from XTMR

ITEM QTY:

MATERIAL:

1	EMT Connectors
2	Elbows (90deg)
12'	Wire (#12 or #14 Gauge) (Single Count)
1	3/4" x 10' Conduit

AC Lights & Switches

ITEM QTY:

MATERIAL:

10	EMT Connectors
8	Elbows (90deg)
4	EMT 'T' Connector
20'	Wire (#12 or #14 Gauge) (Single Count) From Switch to Access Area Light
60'	Wire (#12 or #14 Gauge)(Single Count) From Breaker Box to Switches(2)
55'	Wire (#12 or #14 Gauge)(Single Count) From Switch to Far Lights
15'	Wire (#12 or #14 Gauge)(Single Count) Spliced off of 1 st Light to Light over Filter Boxes
14	3/4" x 10' Conduit
2	Switches
5	Electrical Boxes (Oval)
5	Light Setups
2	Switch Boxes

Sample Line

Already Pre-Determined



KINTRONIC LABS

P.O. BOX 845 BRISTOL, TN 37621-0845 Email: ktl@kintronic.com
1-423-878-3141 FAX: 1-423-878-4224

Kuwait Tower #3

Ground Wand:

<u>ITEM QTY:</u>	<u>MATERIAL:</u>
2	Wand
1	EMT Connectors
3	Elbows (90deg)
?	Lugs
2	Alligator Clips
80'	Wire (#12 or #14 Gauge)(Double Count)
3	½" x 10' Conduit

Intrusion Detector

<u>ITEM QTY:</u>	<u>MATERIAL:</u>
1	Detector
2	EMT Connectors
1	Elbows (90deg)
14'	Wire (#12 or #14 Gauge)(Single Count)
1	½" x 10' Conduit

Smoke Detectors

<u>ITEM QTY:</u>	<u>MATERIAL:</u>
2	Fire/Smoke Detectors
1	EMT Union Coupling
4	EMT Connectors
4	Elbows (90deg)
40'	Wire (#12 or #14 Gauge)(Single Count)
5	½" x 10' Conduit



KINTRONIC LABS

P.O. BOX 845 BRISTOL, TN 37621-0845 Email: ktl@kintronic.com
1-423-878-3141 FAX: 1-423-878-4224

Arc Detectors

ITEM QTY:

MATERIAL:

2	Arc Detectors
4	EMT Connectors
4	Elbows (90deg)
1	EMT Union Coupling
25', 28'	Wire (#12 or #14 Gauge)(Single Count)
5	½" x 10' Conduit

Door Interlock

ITEM QTY:

MATERIAL:

1	Interlock System
2	EMT Connectors
3	Elbows (90deg)
18'	Wire (#12 or #14 Gauge)(Single Count)
2	½" x 10' Conduit

AC Lights & Switches

ITEM QTY:

MATERIAL:

7	EMT Connectors
2	Elbows (90deg)
1	EMT 'T' Connector
25', 30'	Wire (#12 or #14 Gauge) (Single Count)
4	¾" x 10' Conduit
1	Switches
3	Electrical Boxes (Oval)
3	Light Setups
1	Switch Boxes



KINTRONIC LABS

P.O. BOX 845 BRISTOL, TN 37621-0845 Email: ktl@kintronic.com
1-423-878-3141 FAX: 1-423-878-4224

AC Receptacles

ITEM QTY:

MATERIAL:

2	Receptacles (GFCI)
4	EMT Connectors
6	Elbows (90deg)
2	Electrical Boxes
14', 30'	Wire (#12 or #14 Gauge)(Single Count)
4	3/4" x 10' Conduit

AC Main Feed

ITEM QTY:

MATERIAL:

1	EMT Connectors
2	Elbows (90deg)
25'	Wire (#12 or #14 Gauge)(Single Count)
2	3/4" x 10' Conduit

Media / Data Feed

ITEM QTY:

MATERIAL:

1	EMT Union Coupling
1	EMT Connectors
4	Elbows (90deg)
45'	Cable (Single Count)
5	2" x 10' Conduit

Sample Line

Already Pre-Determined



KINTRONIC LABS

P.O. BOX 845 BRISTOL, TN 37621-0845 Email: ktl@kintronic.com
1-423-878-3141 FAX: 1-423-878-4224

**** 2 Distribution Panels: 24"W X 36"L X 8"D ****

Kuwait Tower #1

Ground Wand:

<u>ITEM QTY:</u>	<u>MATERIAL:</u>
2	Wand
1	EMT Connectors
2	Elbows (90deg)
?	Lugs
2	Alligator Clips
60'	Wire (#12 or #14 Gauge)(Double Count)
2	½" x 10' Conduit

Intrusion Detector

<u>ITEM QTY:</u>	<u>MATERIAL:</u>
1	Detector
2	EMT Connectors
1	Elbows (90deg)
12'	Wire (#12 or #14 Gauge)(Single Count)
1	½" x 10' Conduit

Smoke Detectors

<u>ITEM QTY:</u>	<u>MATERIAL:</u>
2	Fire/Smoke Detectors
4	EMT Connectors
1	EMT Union Coupling
4	Elbows (90deg)
40'	Wire (#12 or #14 Gauge)(Single Count)
5	½" x 10' Conduit



KINTRONIC LABS

P.O. BOX 845 BRISTOL, TN 37621-0845 Email: ktl@kintronic.com
1-423-878-3141 FAX: 1-423-878-4224

Arc Detectors

ITEM QTY:

MATERIAL:

2	Arc Detectors
4	EMT Connectors
4	Elbows (90deg)
1	EMT Union Coupling
45'	Wire (#12 or #14 Gauge)(Single Count)
4	½" x 10' Conduit

Door Interlock

ITEM QTY:

MATERIAL:

1	Interlock System
2	EMT Connectors
3	Elbows (90deg)
18'	Wire (#12 or #14 Gauge)(Single Count)
2	½" x 10' Conduit

AC Lights & Switches

ITEM QTY:

MATERIAL:

6	EMT Connectors
3	Elbows (90deg)
1	EMT 'T' Connector
25', 30'	Wire (#12 or #14 Gauge) (Single Count)
4	¾" x 10' Conduit
1	Switches
3	Electrical Boxes (Oval)
3	Light Setups



KINTRONIC LABS

P.O. BOX 845 BRISTOL, TN 37621-0845 Email: ktl@kintronic.com
1-423-878-3141 FAX: 1-423-878-4224

1 Switch Boxes

AC Receptacles

ITEM QTY:

MATERIAL:

2	Receptacles (GFCI)
4	EMT Connectors
5	Elbows (90deg)
2	Electrical Boxes
12', 30'	Wire (#12 or #14 Gauge)(Single Count)
4	$\frac{3}{4}$ " x 10' Conduit

AC Main Feed

ITEM QTY:

MATERIAL:

1	EMT Connectors
4	Elbows (90deg)
45'	Wire (#12 or #14 Gauge)(Single Count)
4	$\frac{3}{4}$ " x 10' Conduit
1	EMT Union Coupling

Media / Data Feed

ITEM QTY:

MATERIAL:

1	EMT Union Coupling
1	EMT Connectors
3	Elbows (90deg)
25'	Cable (Single Count)
2	2" x 10' Conduit

Sample Line



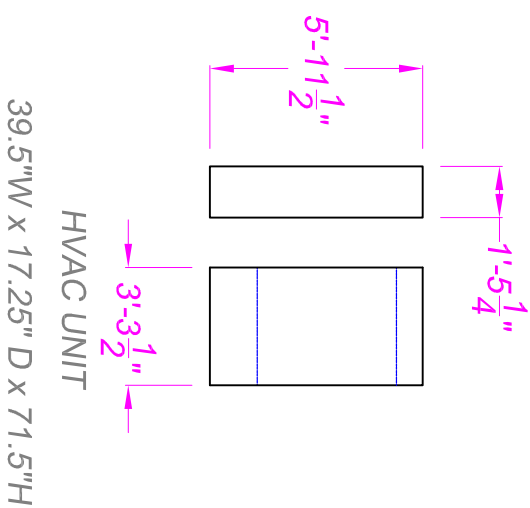
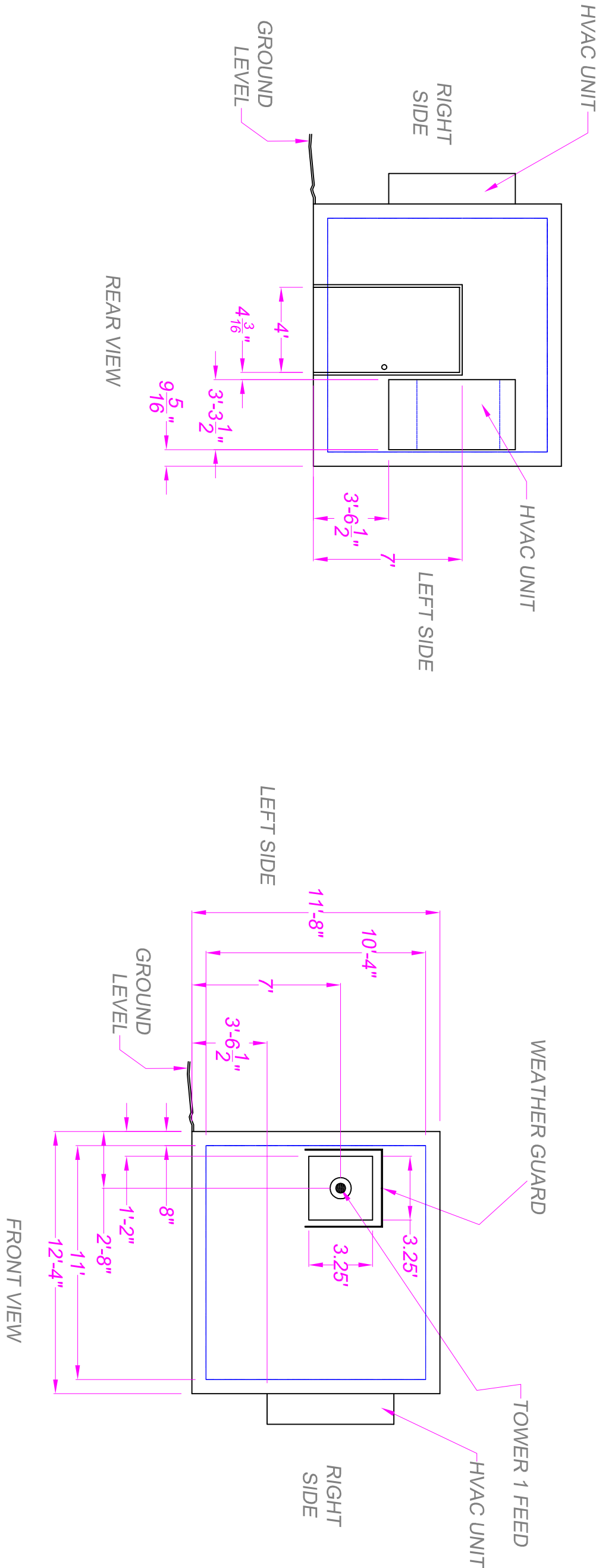
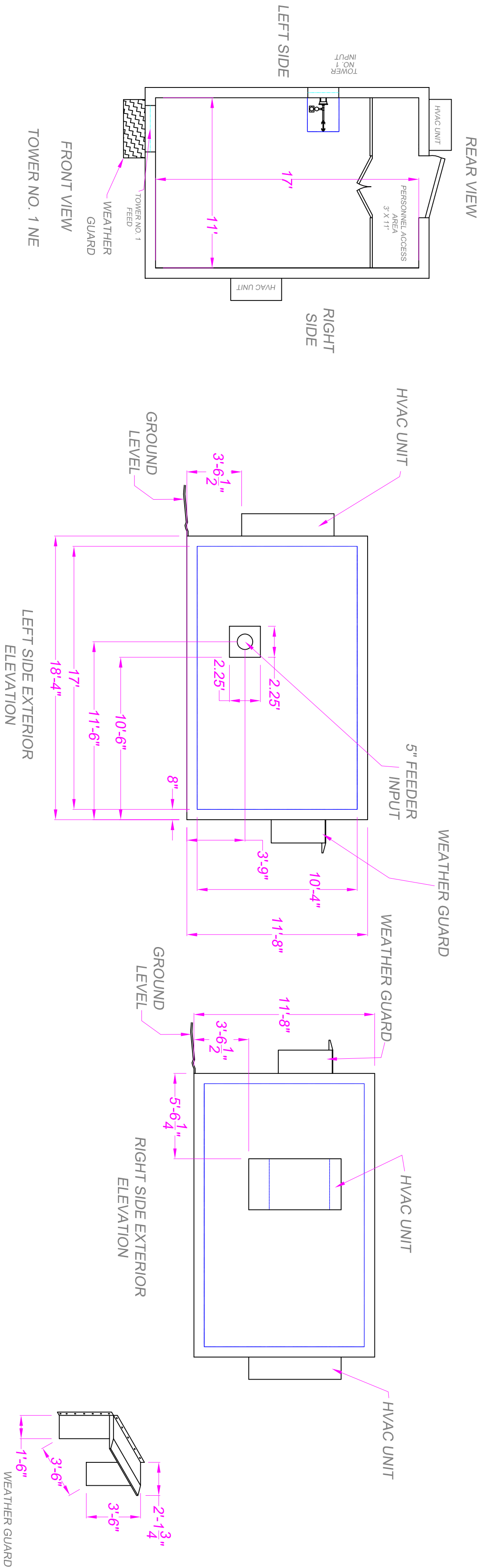
KINTRONIC LABS

P.O. BOX 845 BRISTOL, TN 37621-0845 Email: ktl@kintronic.com

1-423-878-3141 FAX: 1-423-878-4224

Already Pre-Determined


**** 2 Distribution Panels: 24"W X 36"L X 8"D ****

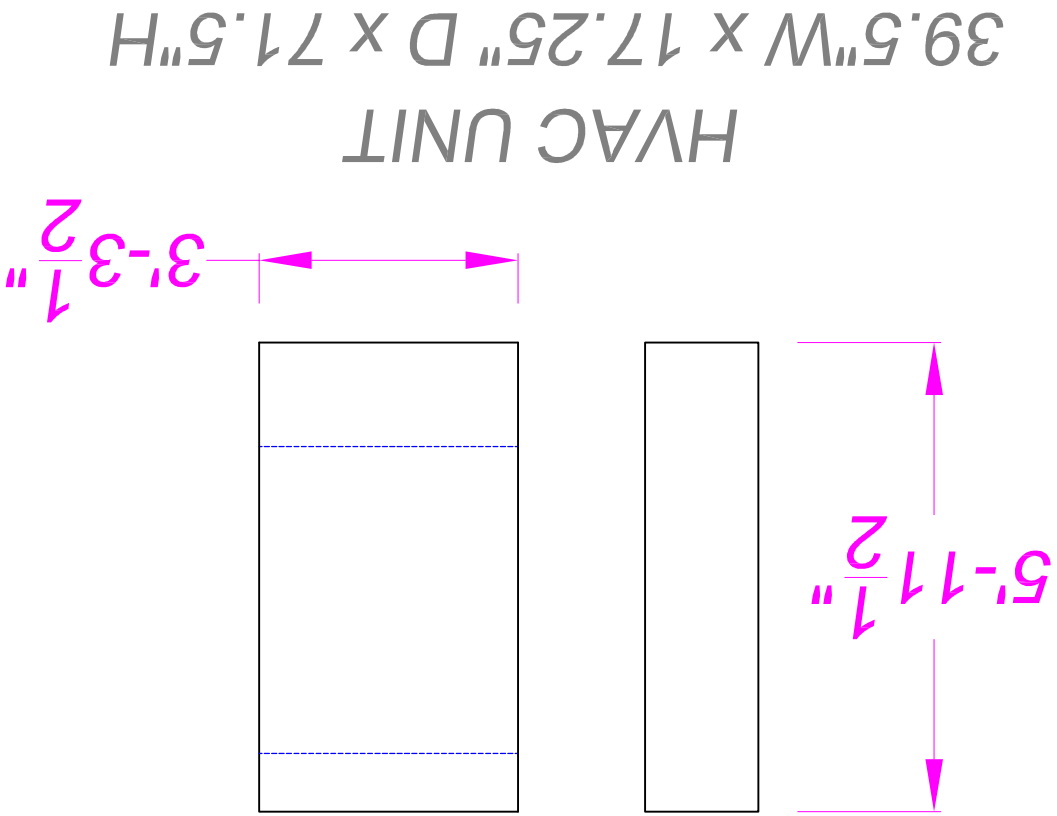
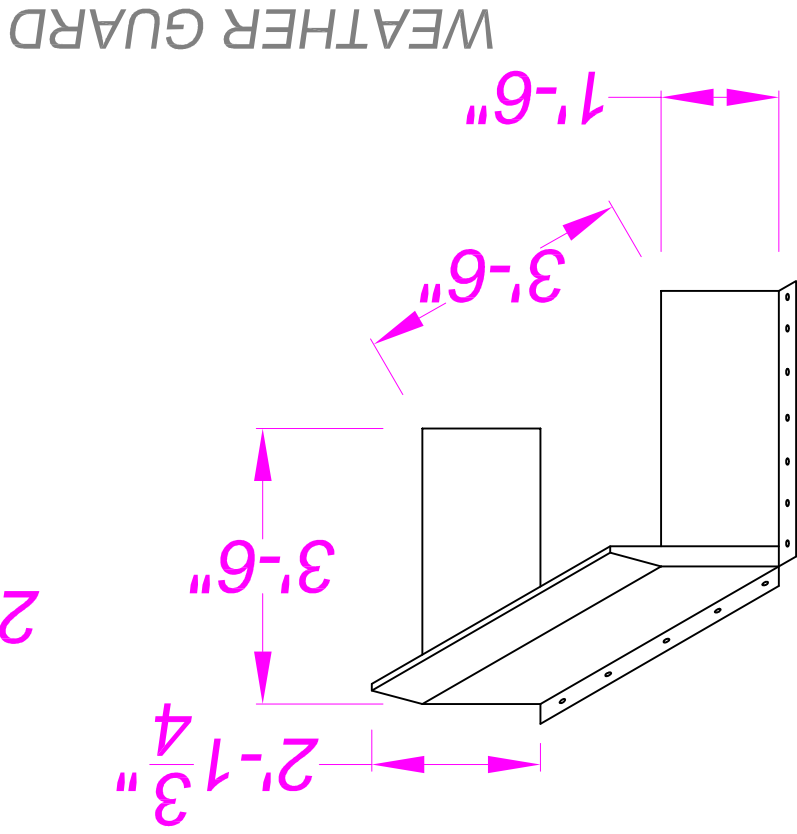
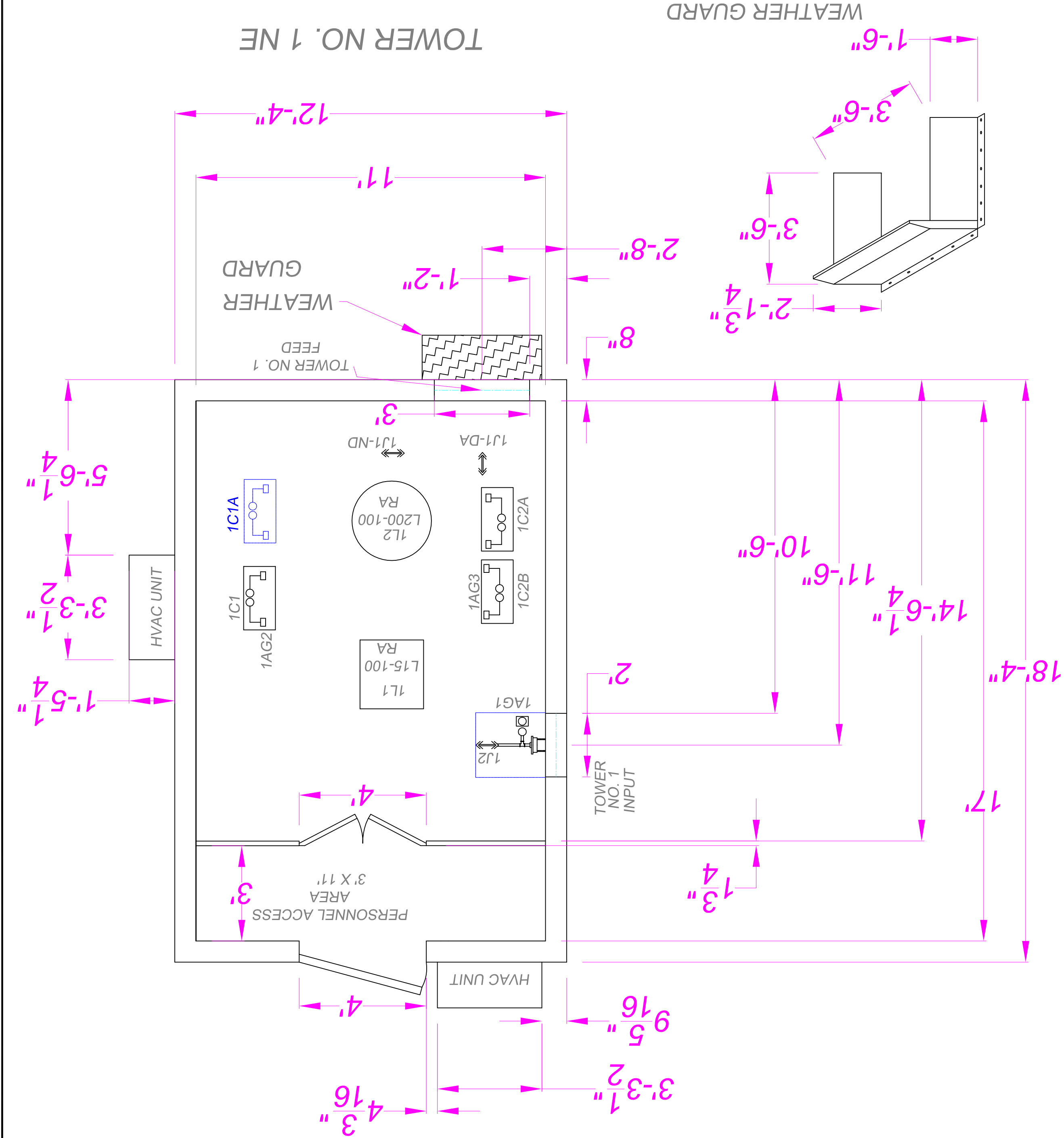


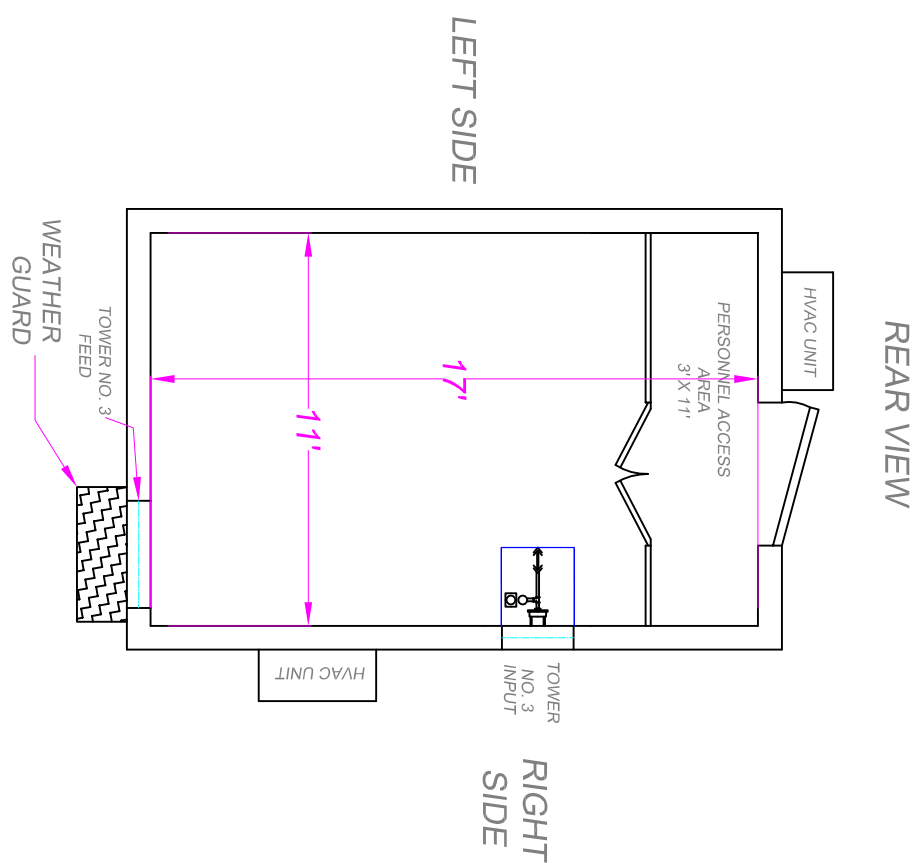
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(8) 12/28/07	TK		
DWG NO:	DATE:		SCALE:
A-5592-2	4/11/07		N.T.S.

REF DWG:		JOB NO:	DRAWN: SCD	
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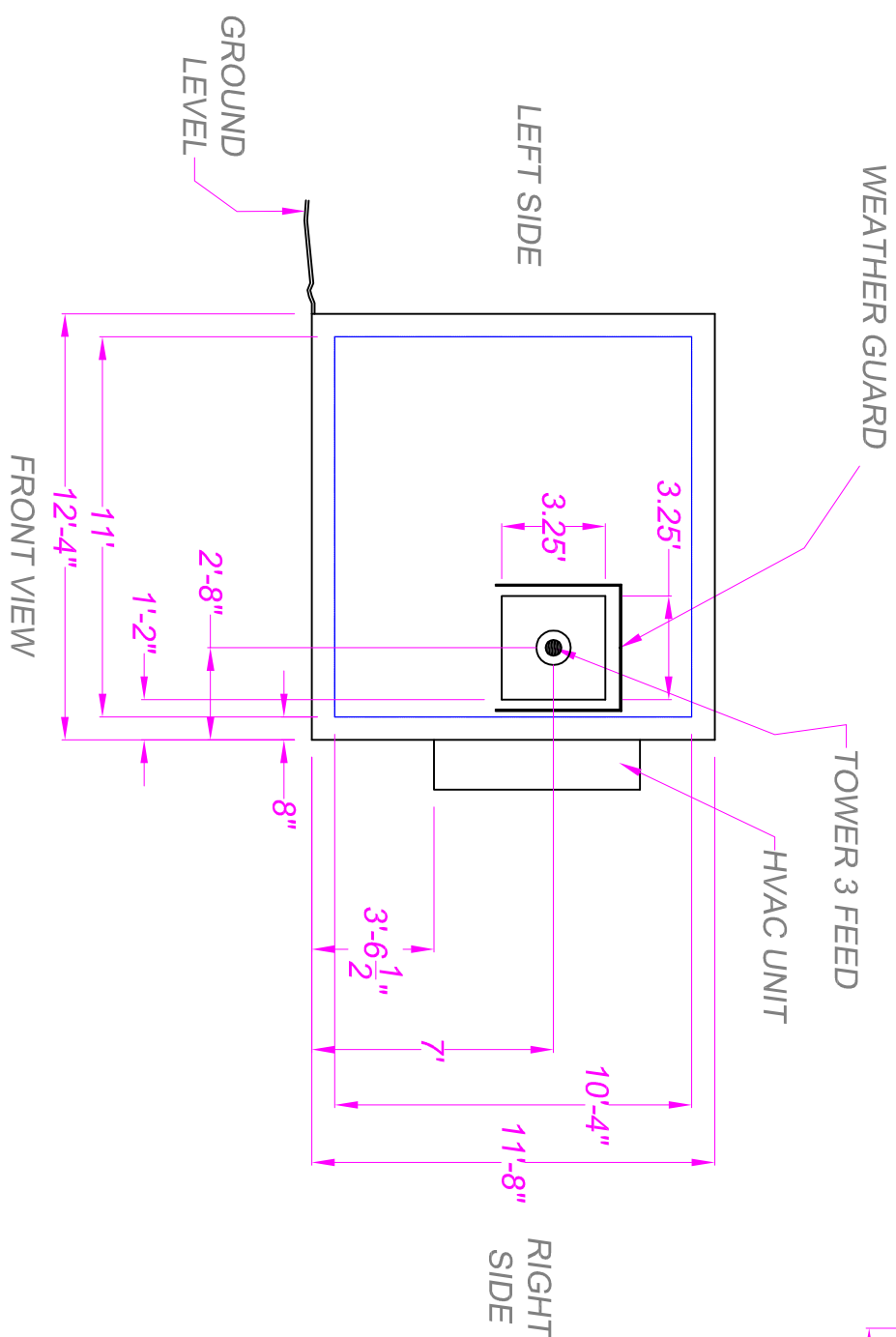
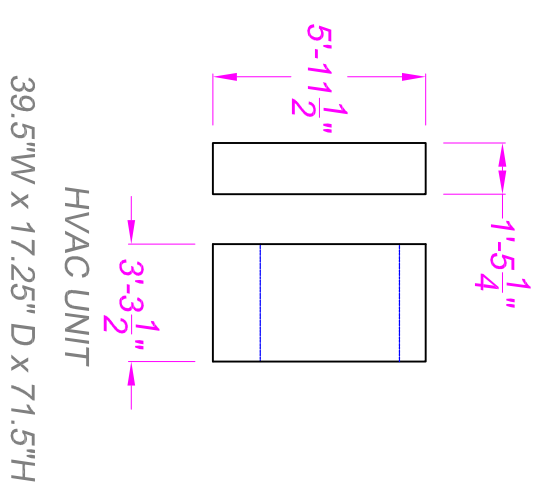
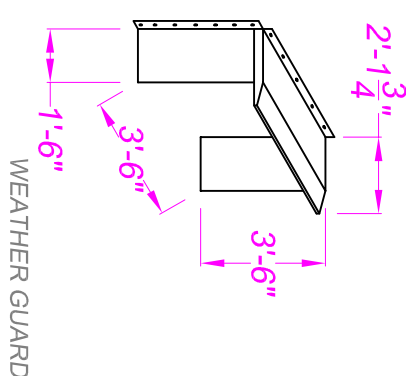
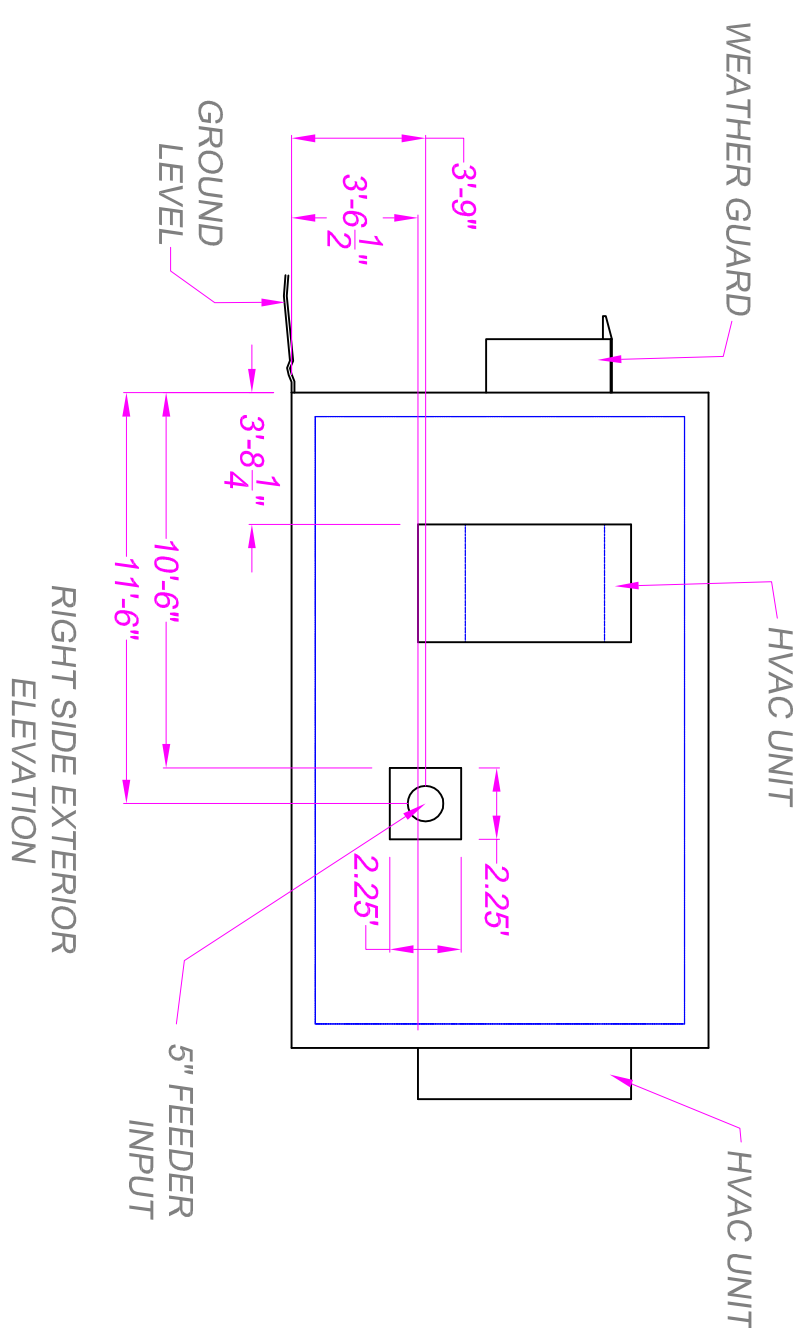
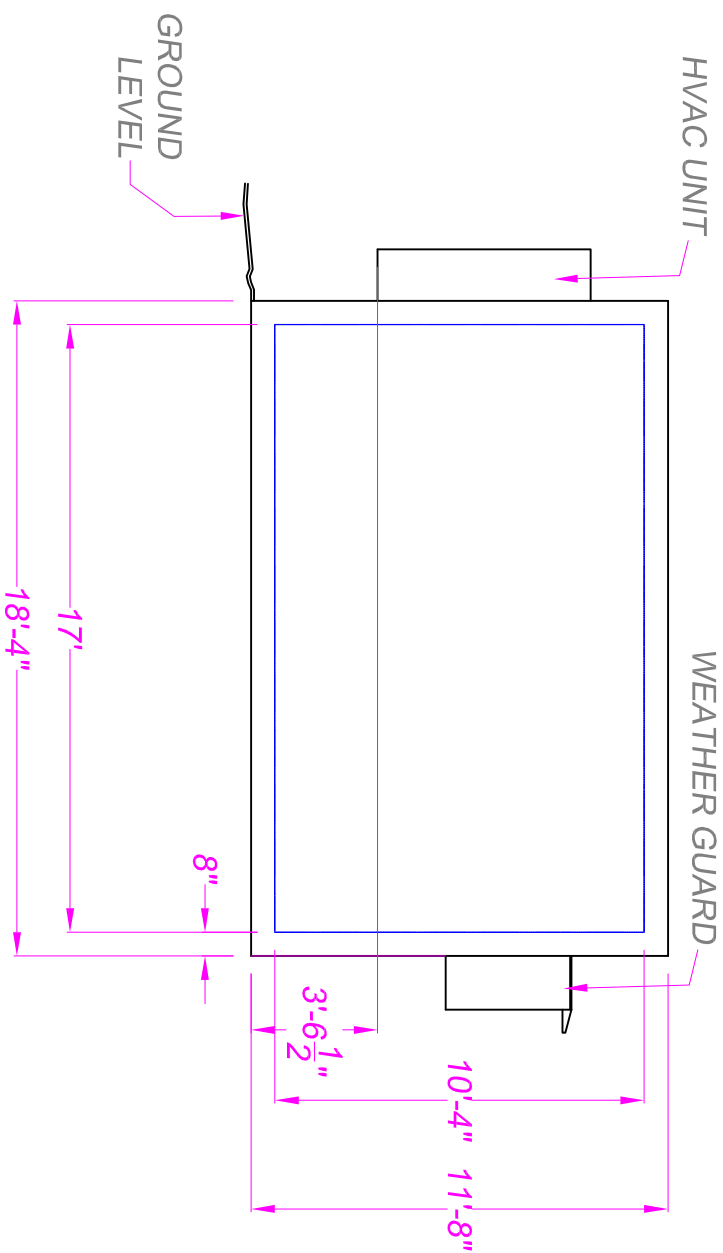
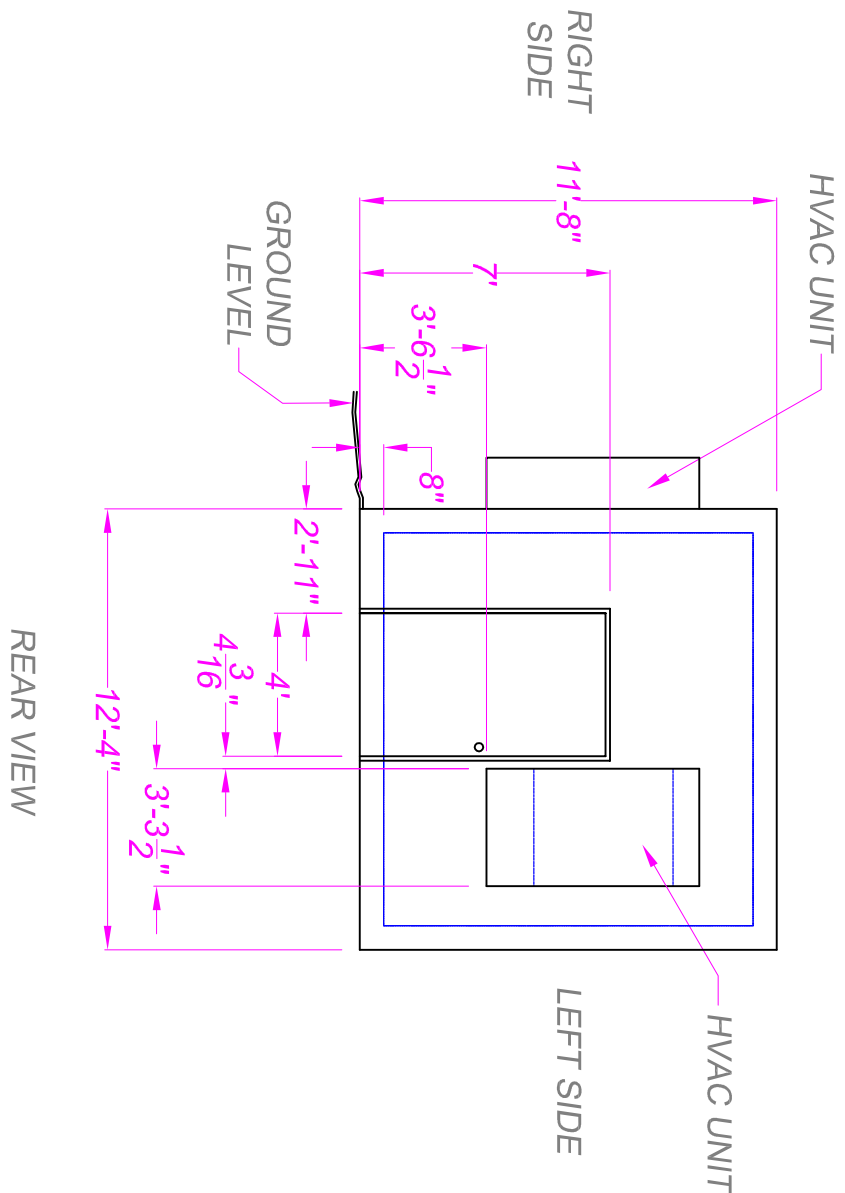
KUWAIT
TOWER NO. 1 NE
BUILDING LAYOUT



BLUFF CITY, TN.
KINTRONIC LABORATORIES INC.



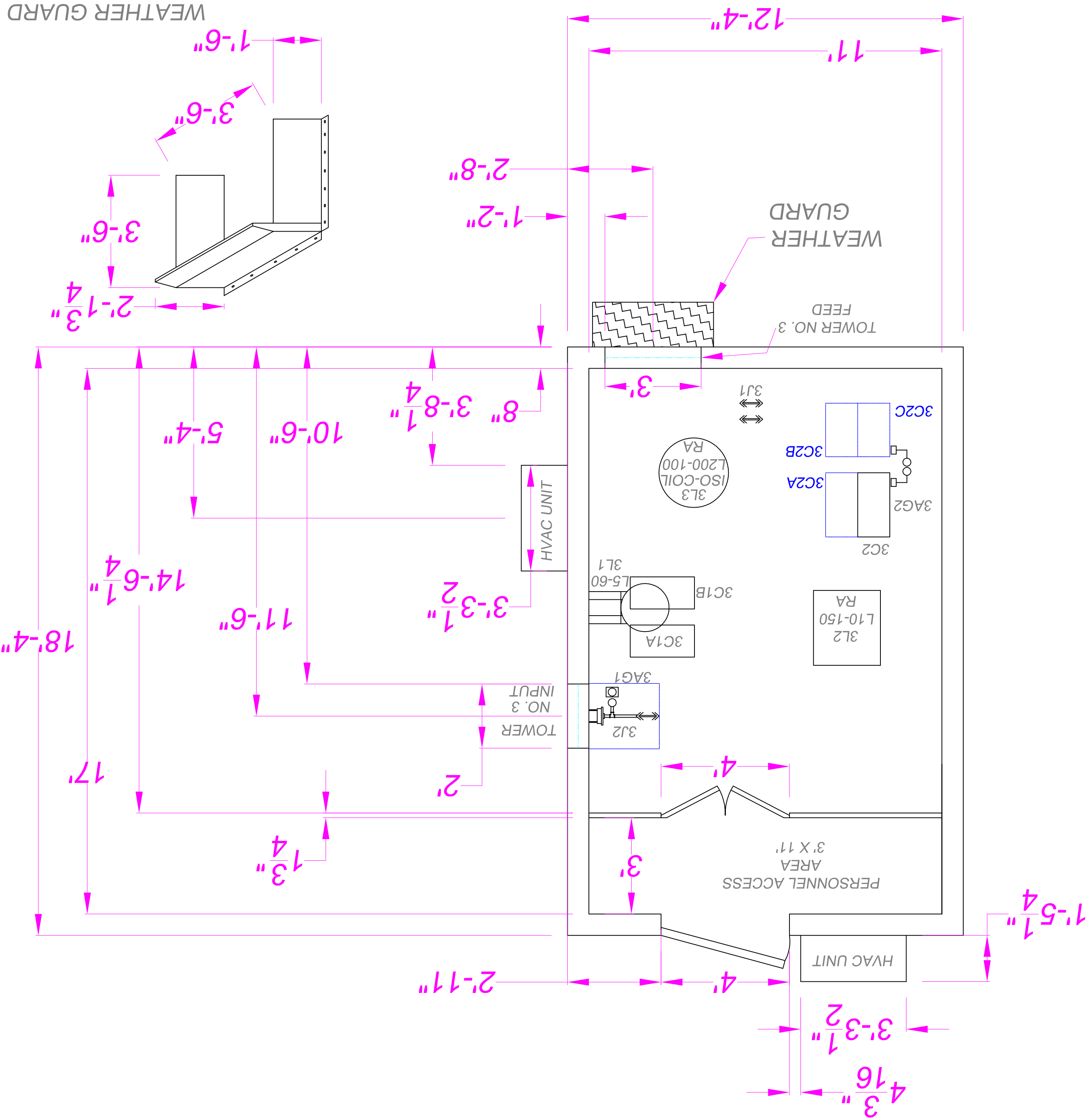


FRONT VIEW
TOWER NO. 3 SW



 KINTRONIC LABORATORIES INC. BLUFF CITY, TN.			
TOWER 3 BUILDING/PORT ELEVATION IBB KUWAIT		REF. DWG.:	DRAWN: SCD
REV: (8) 12/28/07	DESIGNED: TK	JOB NO.:	APPROVED:
DWG NO: A-5592	DATE: 4/11/07		SCALE: N.T.S.

REF DWG:			
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KINTRONIC LABORATORIES INC. BLUFF CITY, TN.			
TOWER NO. 3 SW BUILDING LAYOUT			
JOB NO:		DRAWN:	SCD
		APPROVED:	
		SCALE:	N.T.S.



WEATHER GUARD

TOWER NO. 3 SW

WEATHER GUARD

TOWER NO. 3 FEED

3J1

3C2A

3C2B

3C2C

3C2

3L2
RA
L10-150

3L3
ISO-COIL
L200-100

3C1A

3C1B

3L1
L5-60

3J2

3AG1

TOWER NO. 3 INPUT

HVAC UNIT

HVAC UNIT

PERSONNEL ACCESS
AREA
3' X 11'



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IBB INT'L BROADCASTING BUREAU ERECTION DRAWINGS

KUWAIT

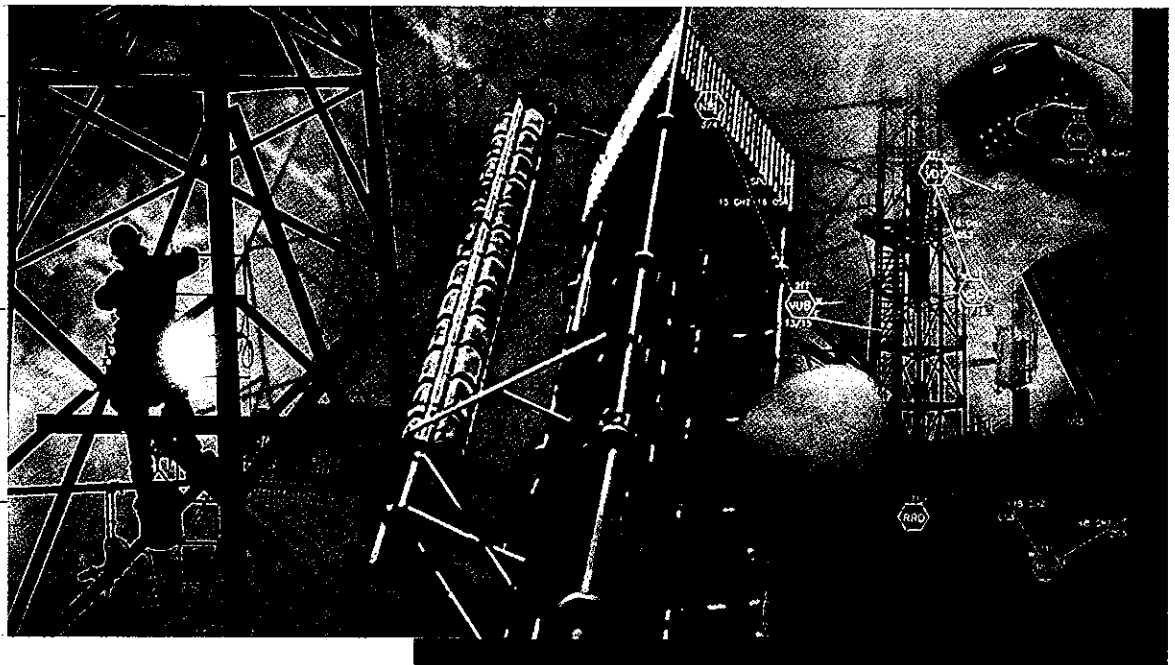
RADIAN ID #: 83-LMLR
FILE NO.: 0170741

NETWORK
DEPLOYMENT

BREADTH OF
SOLUTIONS

ORGANIZED
TO DELIVER

OPERATIONAL
EXCELLENCE



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1 Erection

GENERAL

1. THE GENERAL STRUCTURAL NOTES ARE INTENDED TO AUGMENT THE DRAWINGS AND SPECIFICATIONS. SHOULD CONFLICTS EXIST BETWEEN THE DRAWINGS, SPECIFICATIONS AND/OR THE GENERAL STRUCTURAL NOTES, THE STRICTEST PROVISION SHALL GOVERN.
2. THE STRUCTURE IS DESIGNED TO BE STABLE AFTER THE CONSTRUCTION IS FULLY COMPLETED. THE CREW MUST FOLLOW APPROVED ERECTION PROCEDURES IN ORDER TO ENSURE THE SAFETY OF THE CONSTRUCTION AND ITS PARTS DURING ERECTION.
3. ALL CONSTRUCTION SHALL COMPLY FULLY WITH THE APPLICABLE PROVISIONS OF THE OSHA, AND ALL GOVERNING LOCAL CODES, ALL REQUIREMENTS SPECIFIED IN THE CODES SHALL BE ADHERED TO AS IF THEY WERE CALLED FOR OR SHOWN ON THE DRAWINGS.
4. ALL WORK CONSTRUCTED ACCORDING TO THESE DRAWINGS SHALL BE CHECKED AND VERIFIED BY QUALITY ASSURANCE AS DETERMINED BY THE ENGINEER.
5. WHERE STANDARDS ARE IDENTIFIED WITHOUT A RELEASE DATE IN THESE GENERAL NOTES, THE MOST RECENT VERSION SHALL APPLY.
6. STRUCTURE HAS BEEN DESIGNED IN CONFORMANCE TO THE ANSI/TIA/EIA-222-F WITH BASIC WIND SPEED OF 80MPH.

SCOPE OF WORK

- SCOPE OF WORK FOR RADIAN IS LIMITED TO SUPPLYING THREE TX LINE SUPPORT BRIDGES C/W FOUNDATIONS:
- ONE 125 m LONG FOR 9 3/16" RIGID TX LINE
 - TWO 61.5 m LONG FOR 5" FLEX TX LINE

FOUNDATIONS

1. THE FOUNDATION IS DESIGNED FOR CONDITIONS NOTED AT DRAWINGS 83-LMLR-P04-01 & 83-LMLR-P05-01.
2. WHERE SITE CONDITIONS DIFFER FROM THESE DRAWINGS, CONSULT THE ENGINEER OF RECORD RESPONSIBLE FOR THE FOUNDATION DESIGN.
3. INSPECT THE FOUNDATION INSTALLATION TO ENSURE COMPLIANCE WITH THE PLANS.
4. CHECK AREA FOR LOCATION OF UNDERGROUND PIPES, CABLES, CONDUIT, ETC. PRIOR TO EXCAVATION.
5. ALL WORK SHALL BE DONE IN ACCORDANCE WITH LOCAL CODES AND SAFETY REGULATION REQUIREMENTS. PROCEDURES FOR PROTECTION OF EXCAVATIONS, EXISTING CONSTRUCTION AND UTILITIES SHALL BE ESTABLISHED PRIOR TO COMMENCEMENT OF FOUNDATION WORK.
6. BRACING, SHORING, AND SLOPING OF EXCAVATIONS SHALL BE DONE IN ACCORDANCE WITH ALL LOCAL AND FEDERAL CODES AND SAFETY REGULATIONS.
7. WELDING OF REINFORCING STEEL AND EMBEDMENTS IS PROHIBITED UNLESS OTHERWISE NOTED ON DRAWINGS.
8. CONCRETE COVERAGE OVER ALL STEEL SHALL CONFORM TO ACI 318 BUILDING CODE MINIMUM REQUIREMENTS AND AS SHOWN ON STRUCTURAL DETAILS. THE MINIMUM CLEAR CONCRETE COVER OVER REBAR SHALL BE 3 INCHES.
9. INSPECT BOTTOM OF EXCAVATION PRIOR TO PLACING THE STEEL REINFORCING CAGE AND CONCRETE, TO INSURE NO SIGNIFICANT AMOUNTS OF LOOSE SOIL OR FOREIGN MATERIAL REMAINS.
10. SPACING DEVICES SHALL BE USED AS REQUIRED TO MAINTAIN THE SIDE CLEARANCE BETWEEN THE STEEL REINFORCEMENT AND EXCAVATION WALL.
11. CONCRETE SHALL BE PLACED INTO EXCAVATION WITHOUT UNDUE DELAY, WITH THE USE OF A CHUTE OR HOPPER DEVICE TO DIRECT THE CONCRETE TO FALL WITHIN THE CENTER OF THE STEEL CAGE. CONCRETE SHALL NOT BE ALLOWED TO HIT THE STEEL CAGE IN A MANNER WHICH WOULD CAUSE SEGREGATION OF THE MATERIAL.
12. BACK FILL SHALL BE PLACED IN 9" to 12" HORIZONTAL LIFTS AND COMPACTED TO A MINIMUM 95% OF THE MAXIMUM DRY DENSITY IN ACCORDANCE WITH ASTM TEST DESIGNATION D-698 (STANDARD PROCTOR). THE FILL MATERIAL SHALL BE FREE OF LARGE ROCKS, WASTE, AND DEBRIS AND SHALL BE PLACED AT OR NEAR THE OPTIMUM MOISTURE CONTENT. ALSO REFER TO THE SOIL REPORT FOR RECOMMENDED BACKFILL/COMPACTED FILL PROCEDURES.

CAST-IN-PLACE CONCRETE

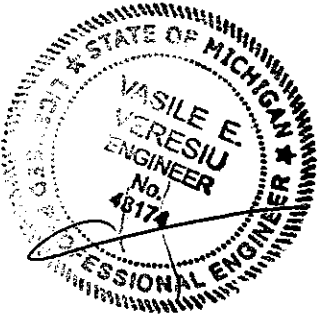

1. CONCRETE WORK SHALL CONFORM TO REQUIREMENTS OF ACI 301 "SPECIFICATION FOR STRUCTURAL CONCRETE FOR BUILDINGS", EXCEPT AS MODIFIED BY STRUCTURAL REQUIREMENTS NOTED ON THE DRAWINGS.
2. ALL CONCRETE SHALL HAVE A MINIMUM SPECIFIED 28-DAY COMPRESSIVE STRENGTH OF 35 MPa, UNLESS OTHERWISE NOTED.
3. ALL REINFORCING STEEL BARS SHALL CONFORM TO ASTM A615, GRADE 60. REINFORCING SHALL BE DETAILED AND FABRICATED IN ACCORDANCE WITH MANUAL OF STANDARD FOR DETAILING REINFORCED CONCRETE (ACI 315 - LATEST EDITION).
4. LAPS, ANCHORAGES AND SPLICES SHALL COMPLY WITH THE REQUIREMENTS OF ACI 318.

STRUCTURAL STEEL

1. ALL STEEL FABRICATION AND INSTALLATION SHALL BE IN ACCORDANCE WITH THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC - 9TH EDITION) MANUAL AND SPECIFICATIONS "SPECIFICATIONS FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS".
2. ALL WELDING SHALL BE DONE USING E-70 ELECTRODES AND IN ACCORDANCE WITH THE AMERICAN WELDING SOCIETY (AWS) STANDARDS AND SPECIFICATIONS ANSI/AWS D1.1.
3. ALL STEEL PLATE AND MISCELLANEOUS MEMBERS SHALL CONFORM TO ASTM A572, GRADE 42 STEEL SPECIFICATION - MINIMUM 44 KSI YIELD STRENGTH AND/OR CSA G40.21 GRADE 300 STEEL SPECIFICATION.
4. THE FINISHED DIAMETER OF BOLT HOLES SHALL NOT BE MORE THAN 1/16 INCH LARGER THAN THE NOMINAL BOLT DIAMETER UNLESS OTHERWISE NOTED.
5. CUT EDGES SHALL BE TRUE AND SMOOTH, AND FREE FROM EXCESSIVE BURRS AND RAGGED BREAKS. SHEARED EDGES OF THICK PLATES SHALL BE PLANED TO A DEPTH OF 1/4 INCH. RE-ENTRANT CUTS SHALL BE AVOIDED. IF USED, THEY SHALL BE FILLETED BY DRILLING PRIOR TO CUTTING.
6. TOLERANCES AS INDICATED IN THE AISC CODE OF STANDARD PRACTICE SHALL BE CAREFULLY FOLLOWED DURING FABRICATION.
7. PRIOR TO GALVANIZING, ALL FABRICATED STEEL SHALL BE THOROUGHLY SHOP INSPECTED AND QUANTITIES COUNTED ACCORDING TO ENGINEER APPROVED QUALITY CONTROL INSPECTION METHODS.
8. ALL BOLTS, WASHERS AND NUTS SHALL CONFORM TO ASTM A325 UNLESS NOTED OTHERWISE.
9. ALL EXPOSED STEEL AND HARDWARE SHALL BE HOT-DIPPED GALVANIZED PER ASTM A123 SPECIFICATIONS AFTER FABRICATION.

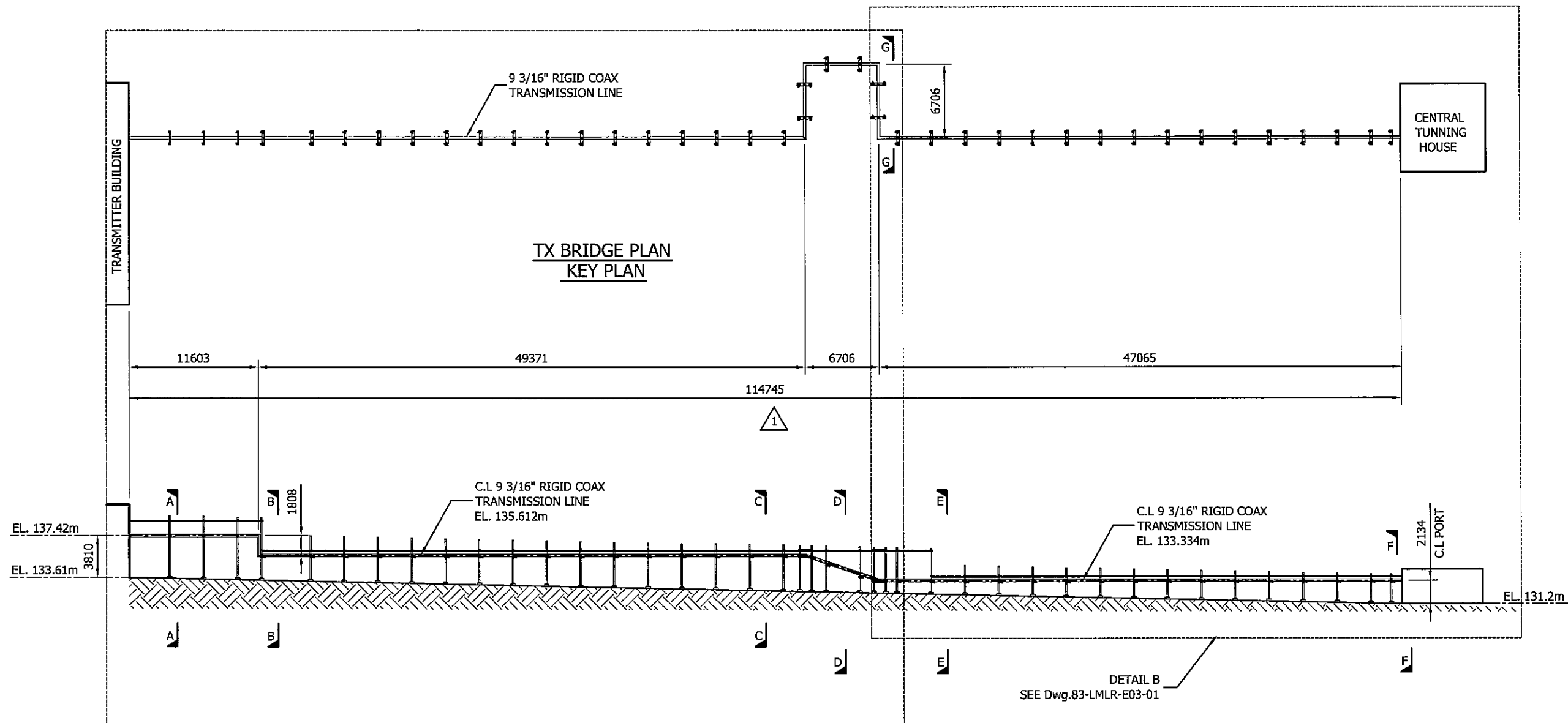
FIELD ERECTION

1. THE CREW SHOULD COMPLY WITH ALL INSTALLATION PROCEDURES, SAFEGUARDS AND MEANS AND METHODS OF CONSTRUCTION. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH OSHA REQUIREMENTS.
2. ERECTION METHODS AND TOLERANCES SHALL COMPLY WITH ANSI/TIA/EIA-222. MINIMUM RECOMMENDED WEATHER CONDITIONS THAT SHOULD BE OBSERVED TO ENSURE A SAFE WORKING CONDITION SHALL BE: WIND SPEED NOT TO EXCEED 25 MPH, AND NO THUNDERSTORMS FORECASTED.
3. ALL PRECAUTIONS AND EFFORTS SHALL BE TAKEN TO ENSURE THE TOWER STABILITY DURING THE ERECTION PROCESS.
4. INSTALLATION OF THE TRANSMISSION LINES SHALL BE AS SHOWN ON THE LAYOUT DRAWINGS AND IN ACCORDANCE WITH THE MANUFACTURERS REQUIREMENTS AND INSTALLATION INSTRUCTIONS.
5. ANY STRUCTURAL MEMBERS THAT HAVE DAMAGED GALVANIZED SURFACES SHALL BE CLEANED AND TOUCHED UP WITH TWO COATS OF ZINC-RICH PAINT.
6. UPON COMPLETION OF ALL WORK, THE SITE SHALL BE CLEARED OF ALL DEBRIS AS REQUIRED AND ANY SURPLUS MATERIALS NOT REMOVED FROM THE SITE SHALL BE NEATLY STORED IN AN AREA DESIGNATED BY THE OWNER OR THE OWNER'S REPRESENTATIVE.
7. ALL WORKERS MUST BE PROVIDED WITH HALOGEN HEADLAMPS FOR THEIR HARD HATS FOR NIGHT WORK ALOFT. A SPOTLIGHT OF APPROXIMATELY 500,000-CANDLE POWER MUST FOLLOW THE WORKER FROM THE GROUND. THE SPOTLIGHT SHALL PROVIDE A MINIMUM OF 5 FOOT-CANDLES OF LIGHT IN THE CLIMBER'S IMMEDIATE WORK AREA.

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0170741				
REVISIONS				
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DWG REFERENCE				
				
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KUWAIT				
DWN:	M.G	CHK'D:	BBB	DATE: Oct/31/2007
ENG'R:	E.V		ENG'R APP'D:	
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Nov/15/2007 2:40:47 PM

1 (Erection)



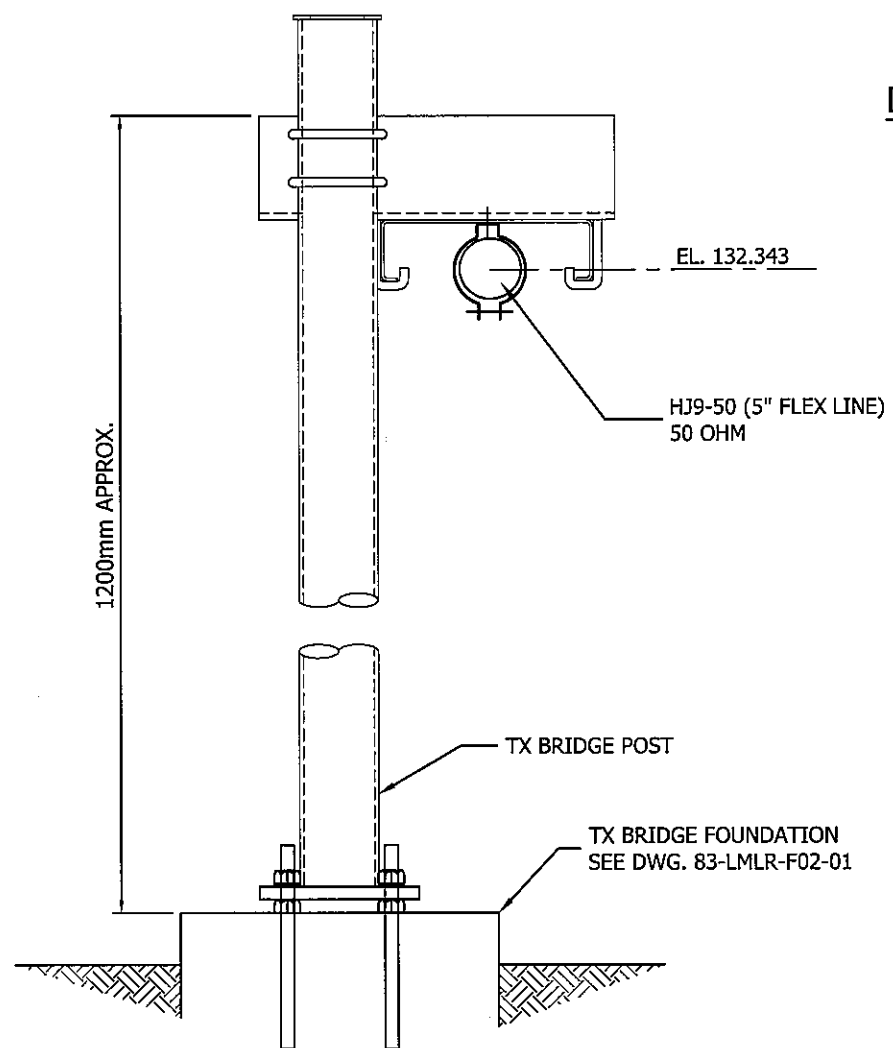
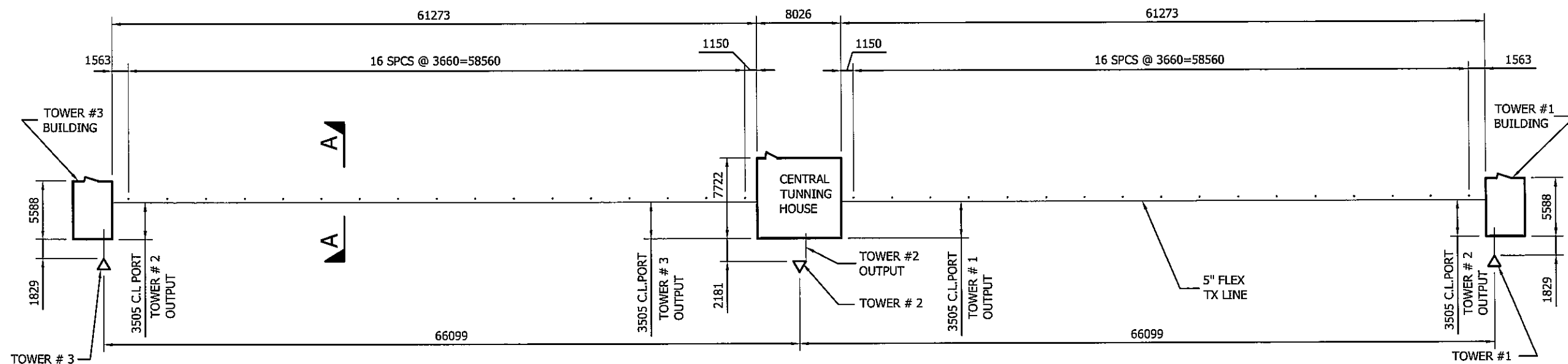
TX BRIDGE ELEVATION
KEY PLAN

DETAIL 1

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83-LMLR-E02-01				
83-LMLR-E03-01				
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M.G	BBB	Oct/22/2007		
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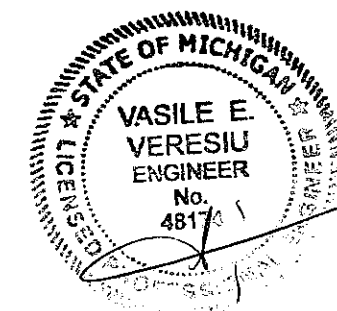


SECTION A-A

NOTE:
FOR PART NO's AND INSTALLATION DETAILS SEE DWG. 83-LMLR-E03-03

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1	NOTE ADDED	BBB	BBB	E.V
DATE: Nov/19/2007				

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83-LMLR-F02-01	
83-LMLR-E03-03	

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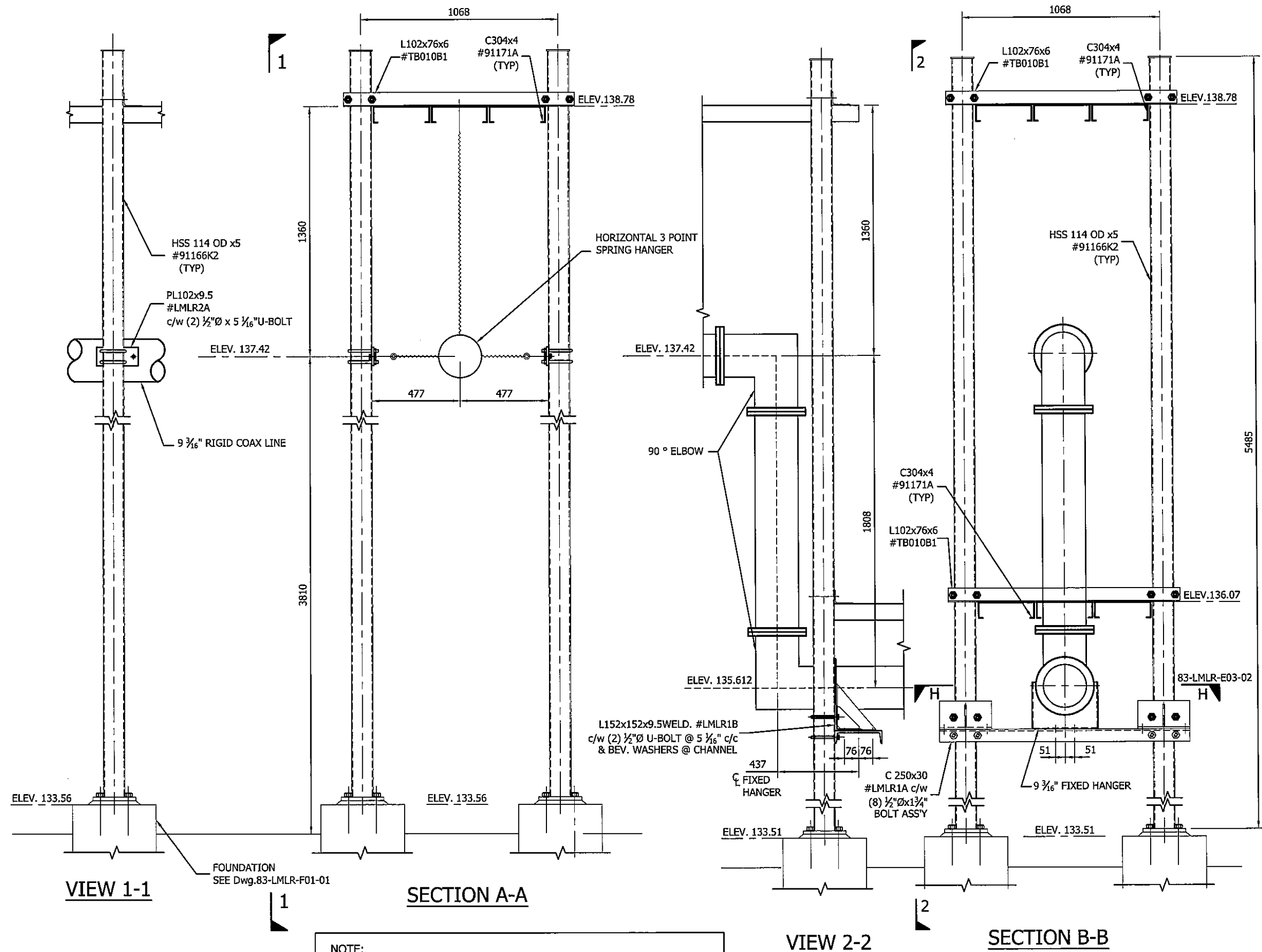
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TX BRIDGE
DETAIL A
KUWAIT

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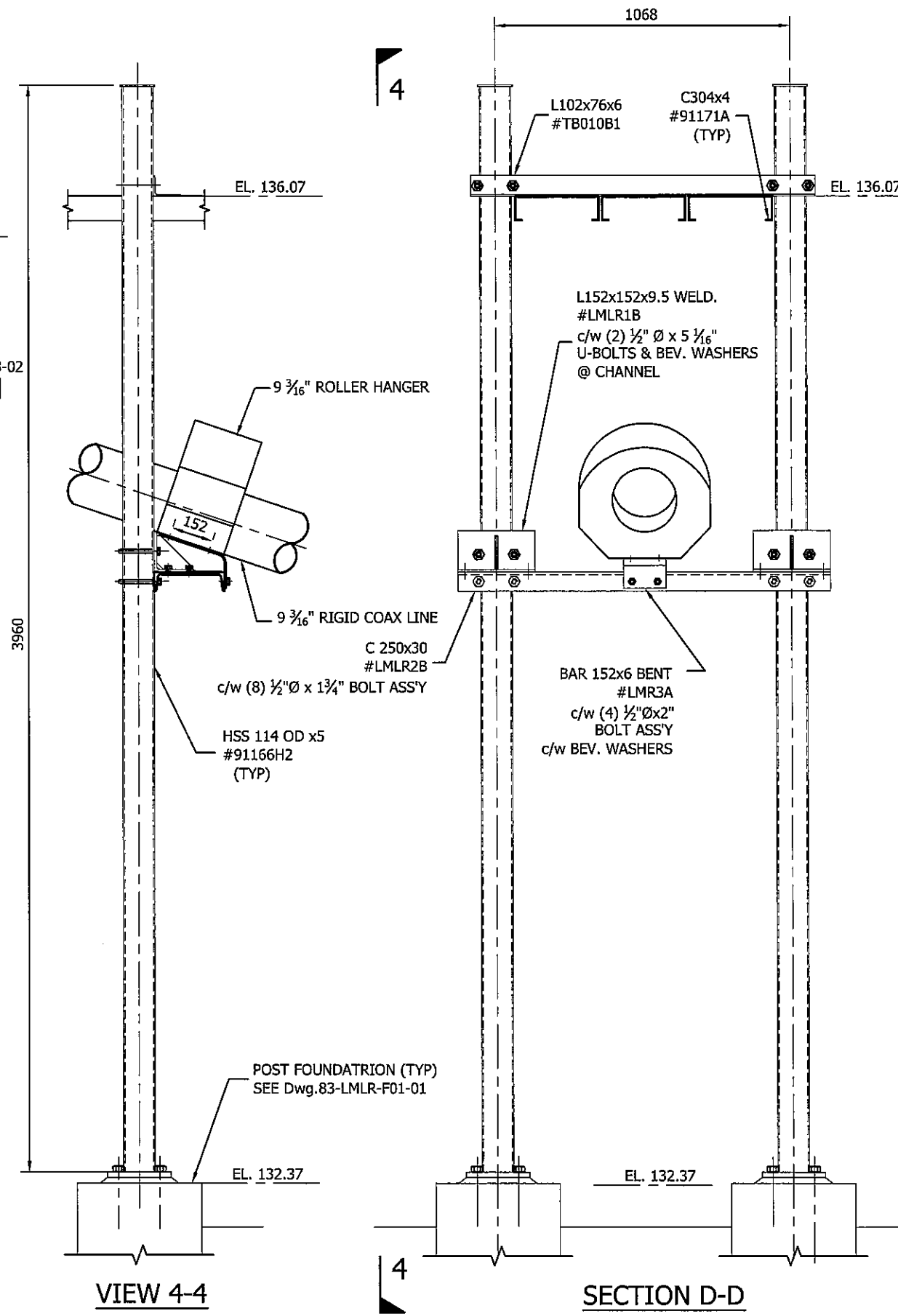
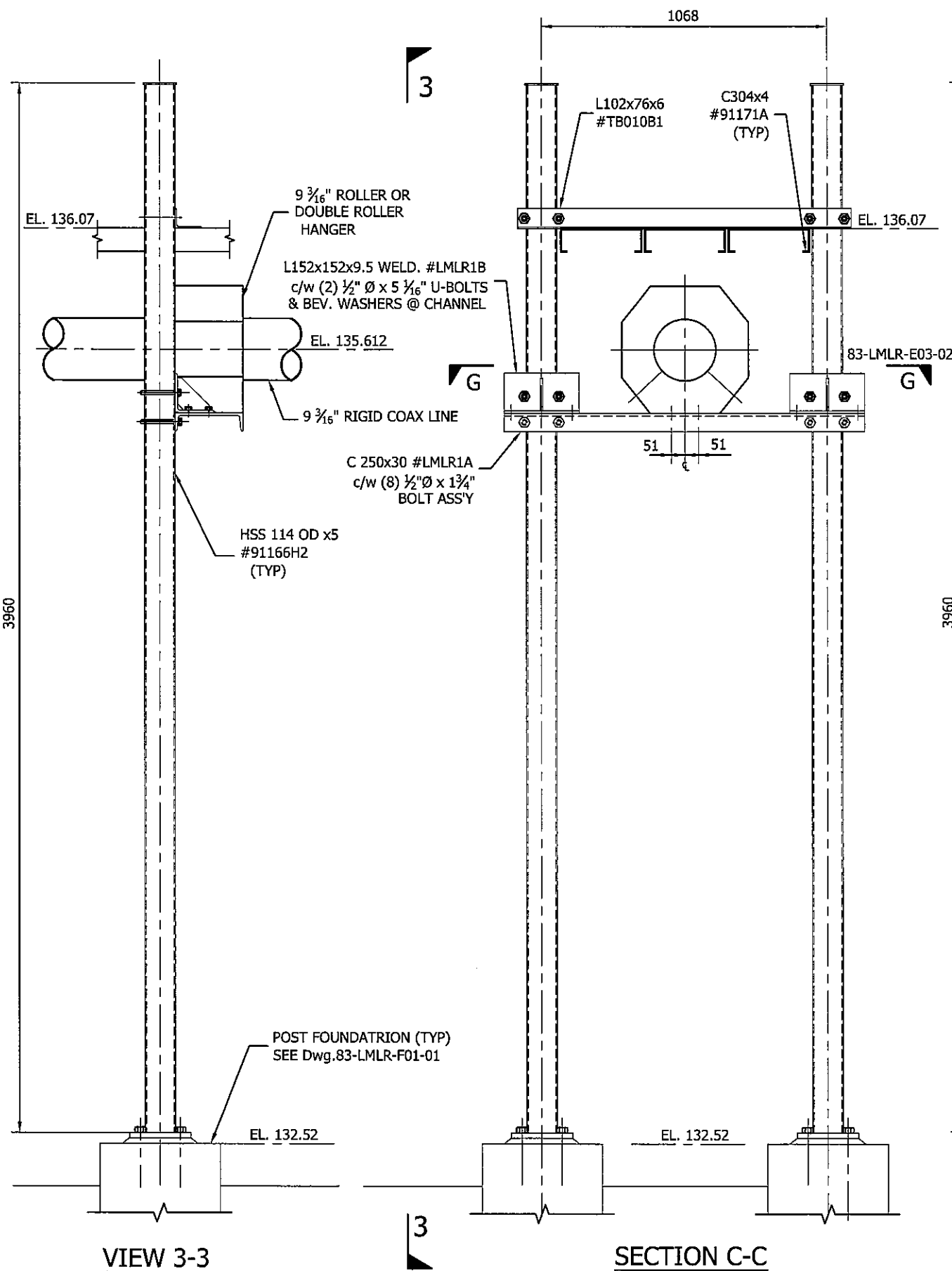
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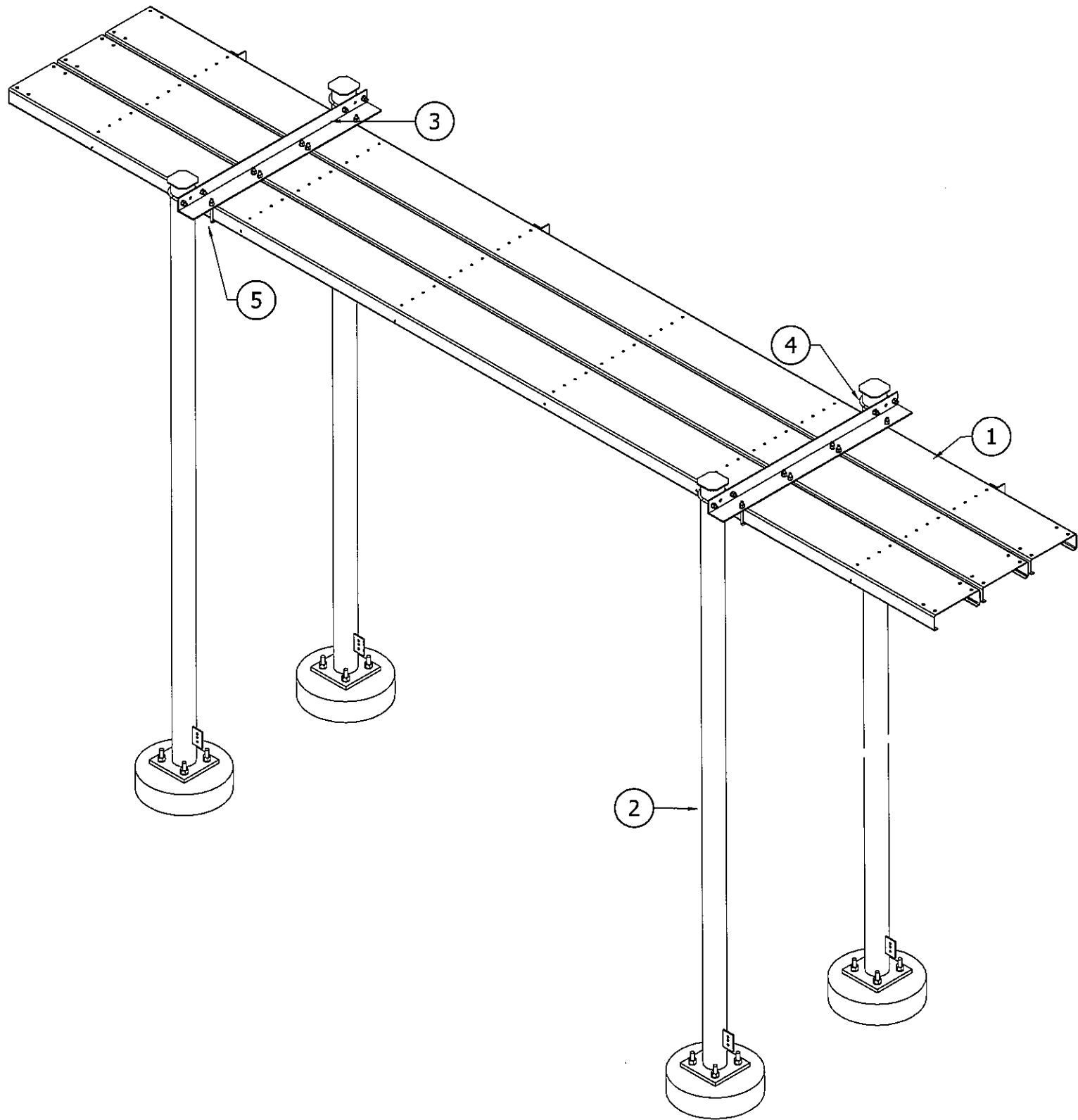
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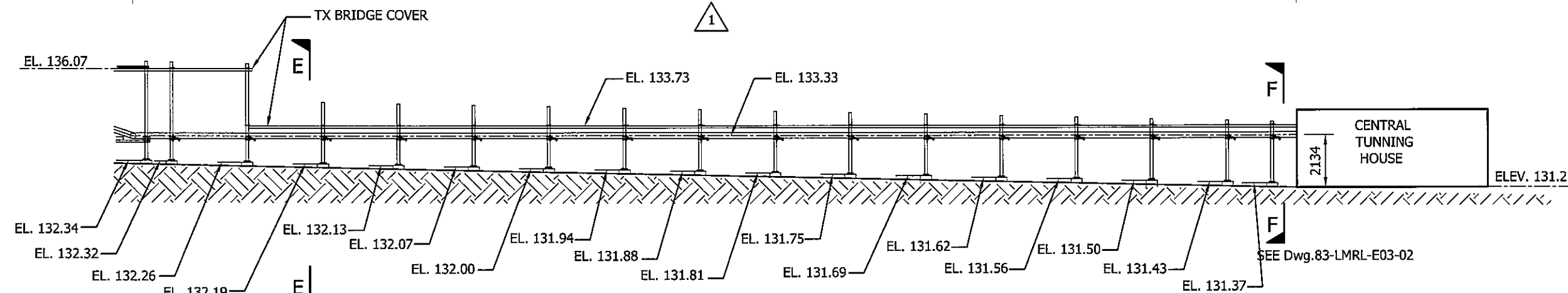
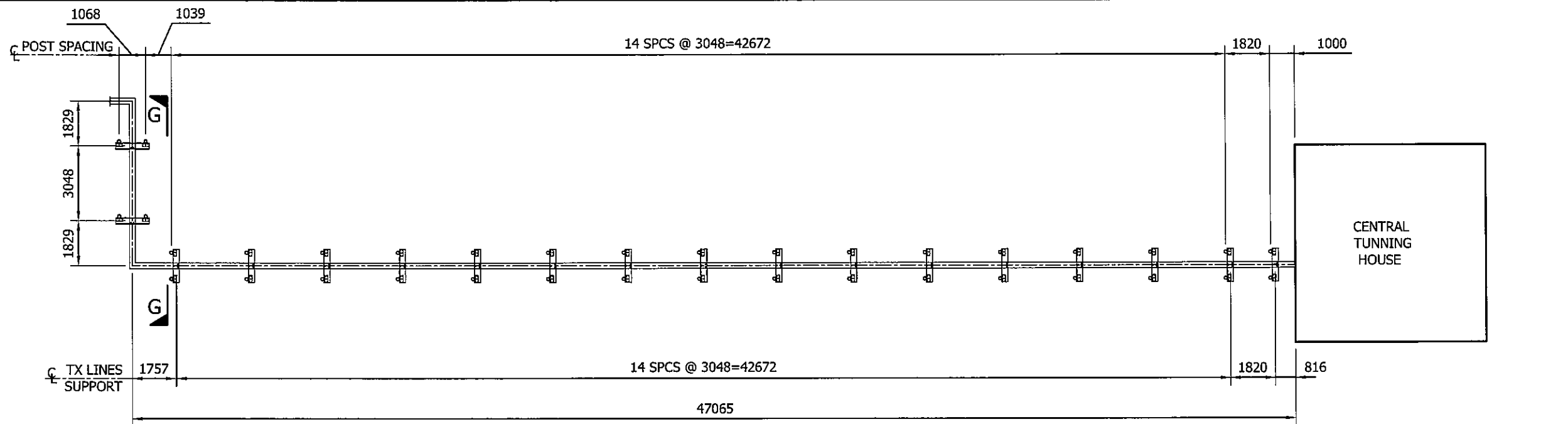
NOTE:
FOR PART NO'S AND INSTALLATION DETAILS SEE DWG. 83-LMLR-E02-04

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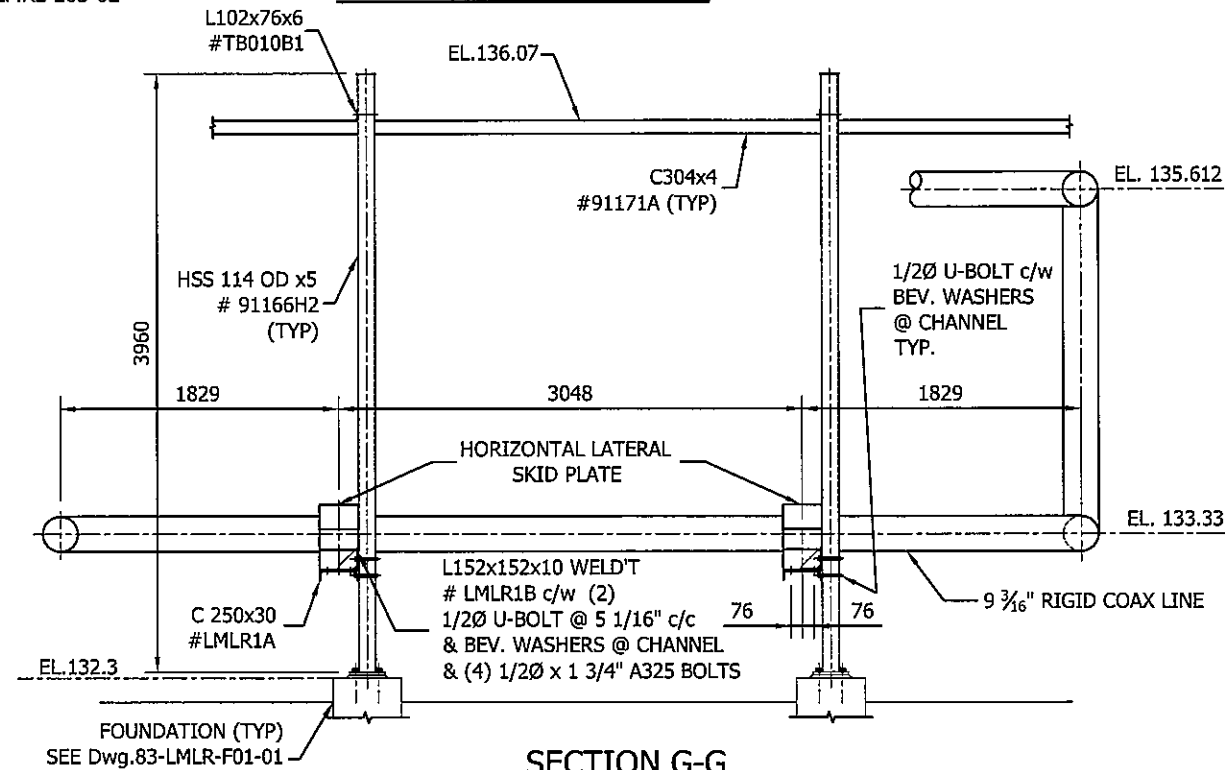
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2	91166C2, 91166H2 OR 91166K2	HSS 4 1/2" Ø ODx WELD'T
3	TB010B1	BRACE ARM L 4x3x1/4"
4	110260	1/2"Ø U-BOLTS @ 5 1/16"c/c
5	111041	1/2"Ø SQUARE J-BOLTS



FILE NO.					0170741				
REVISIONS									
REV.	DESCRIPTION	DWN	CHK	APP					
DEC 03 2007									
DWG REFERENCE									
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IBB INT'L. BROADCASTING BUREAU TX BRIDGE TRANSMITTER BLDG. TO TUNNING BLDG. KUWAIT									
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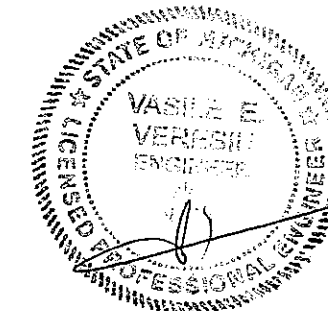
TX BRIDGE DETAIL B



SECTION G-G

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DATE: Nov/16/2007				

DEC 9 3 2007



DWG REFERENCE	
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83-LMLR-F01-01	
10-WMYF-E09-05	



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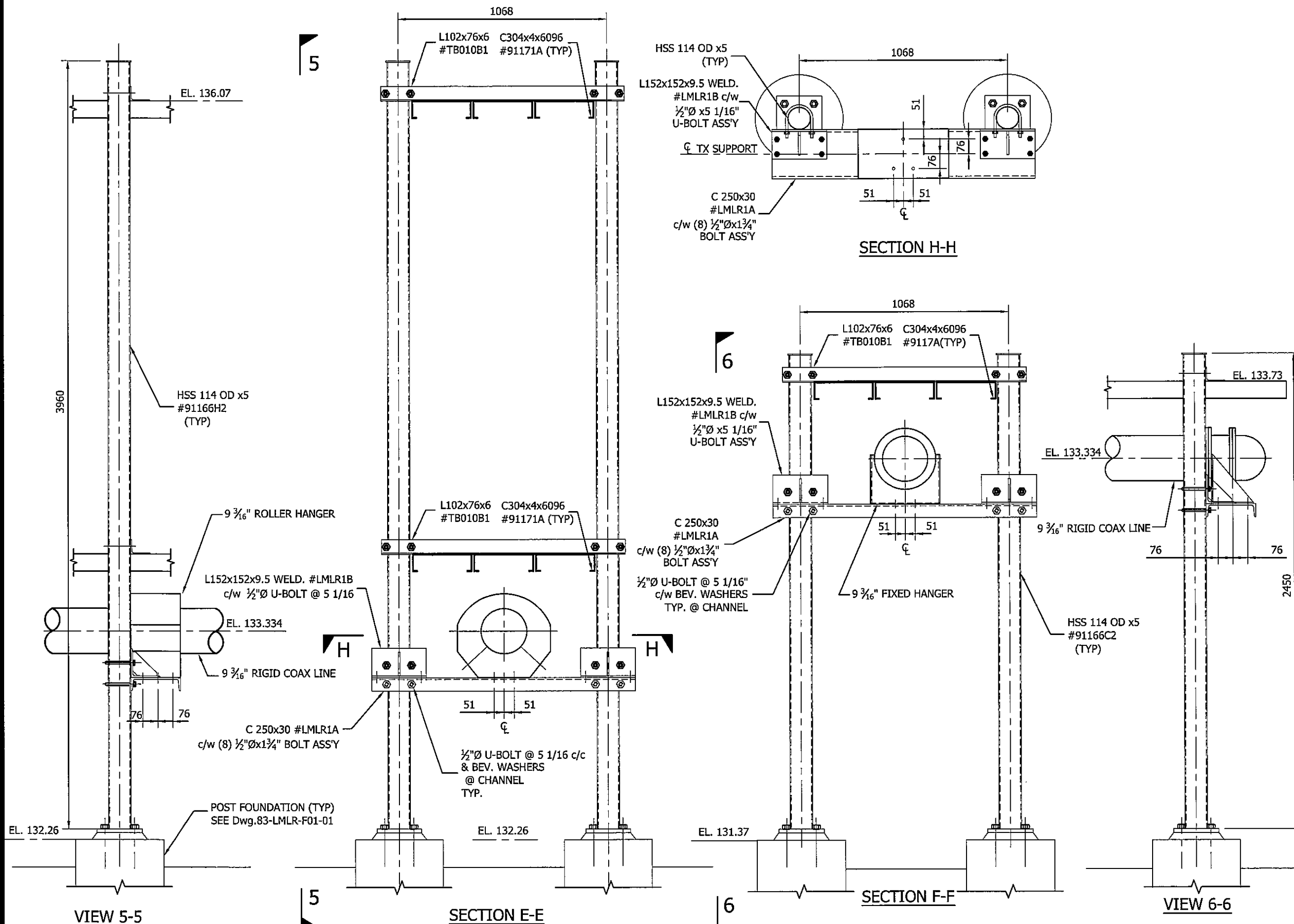
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 TX BRIDGE
 DETAIL B SECTIONS G-G, I-I
 KUWAIT

DWN:	M.G	CHK'D:	BBB	DATE:	Oct/24/2007
ENGR:	E.V	ENGR APP'D:			
DRAWING NO: 83-LMLR-E03-01					REV: 1

Nov/19/2007 2:41:15 PM

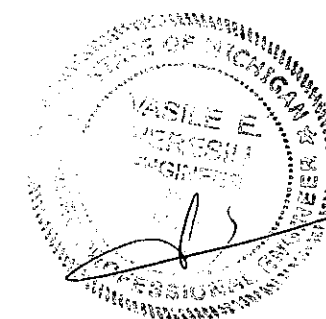
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NOTE:
FOR PART NO's AND INSTALLATION DETAILS SEE DWG. 83-LMLR-E02-04

FILE NO. 0170741				
REVISIONS				
REV.	DESCRIPTION	DWN	CHK	APP
1	NOTE ADDED	BBB	BBB	E.V
DATE: Nov/19/2007				

DEC 03 2007



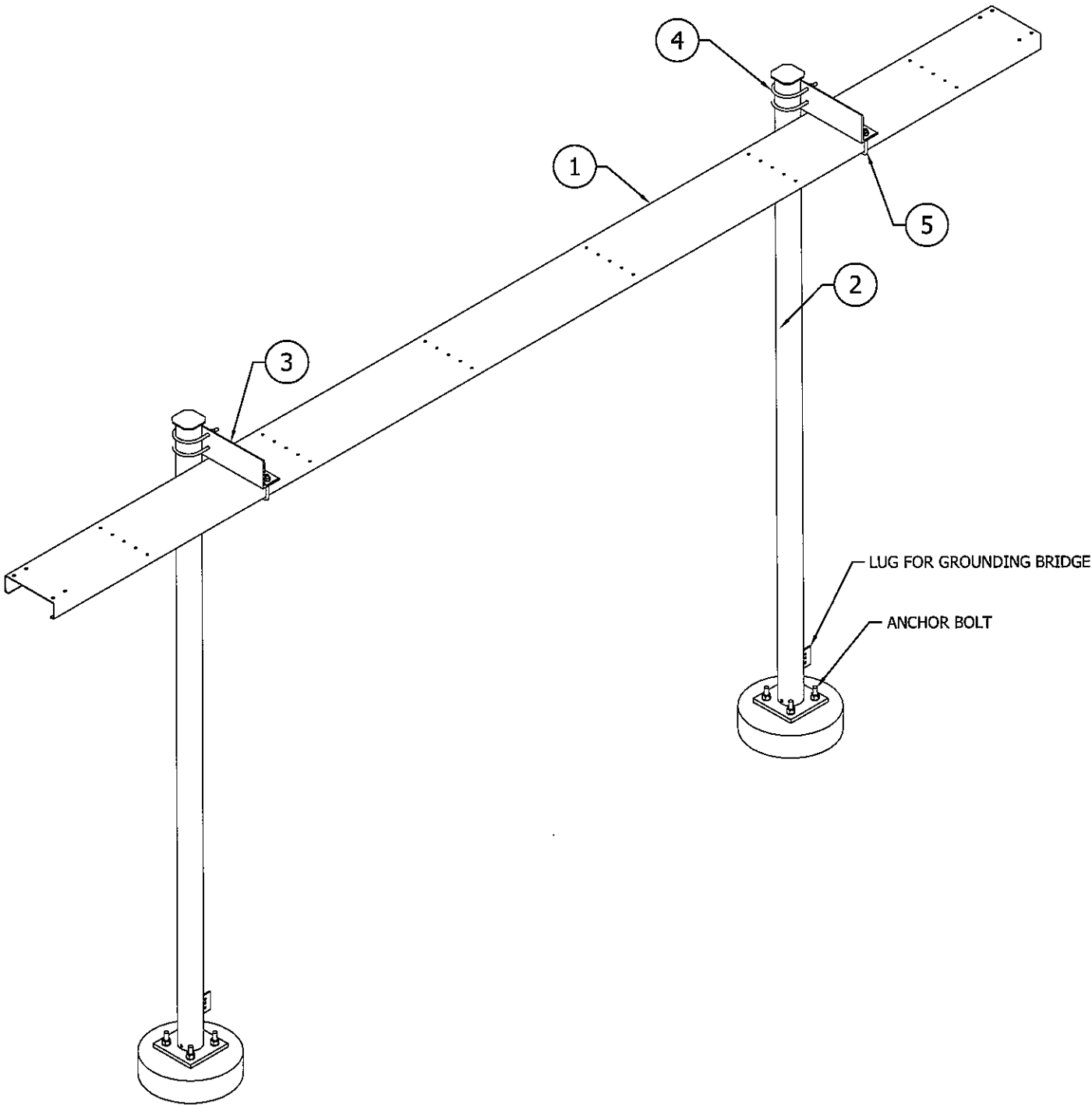
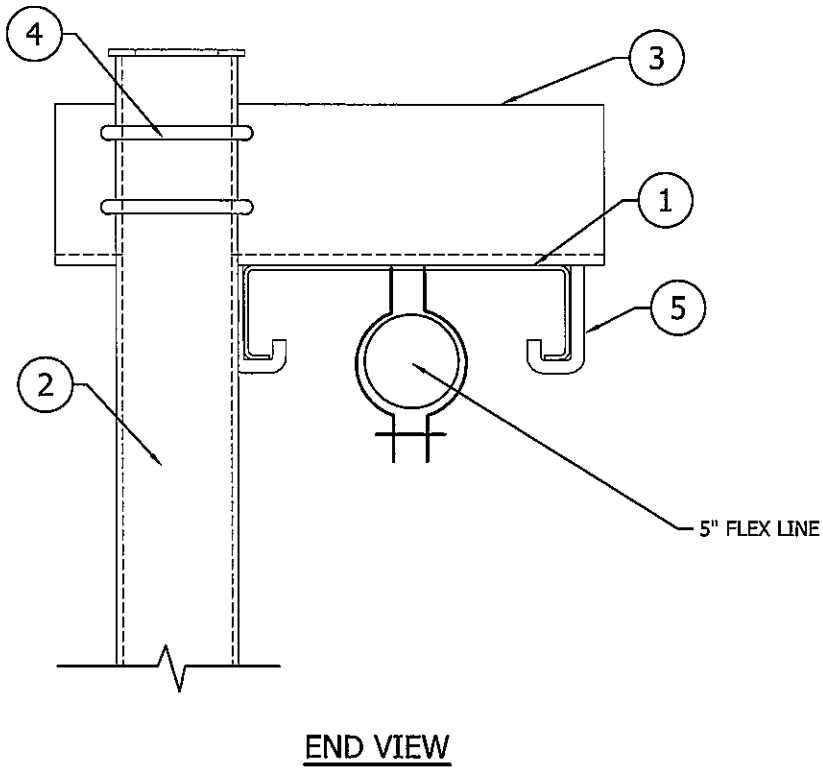
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83-LMLR-E03-01	
83-LMLR-F01-01	
83-LMLR-E04-02	

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IBB INT'L. BROADCASTING BUREAU TX BRIDGE DETAIL B SECTION E & F KUWAIT				
DWN:	M.G	CHK'D:	BBB	DATE: Oct/29/2007
ENGR:	E.V	ENGR APP'D:		
DRAWING NO:	83-LMLR-E03-02			REV: 1

MATERIAL		
1	91171A OR 91171B	SAMSON CHANNEL 12"@5/32"x20' OR 10'
2	91166A2	HSS 4 1/2"ODx6' WELD'T
3	TX001A	BRACE ARM L 6x4x3/8"
4	110260	1/2"Ø U-BOLTS @ 5 1/16"c/c
5	111041	1/2"Ø SQUARE J-BOLTS



FILE NO.

0170741

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REV.	DESCRIPTION	DWN	CHK	APP

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TX BRIDGE

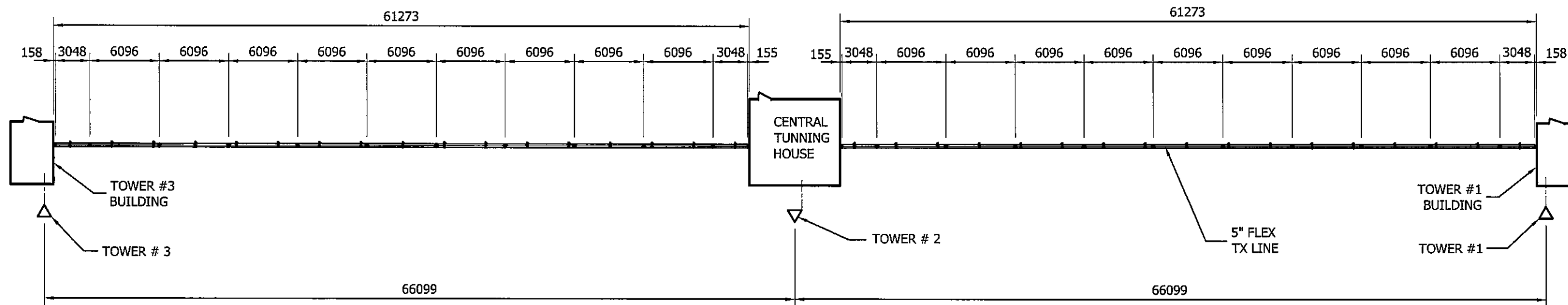
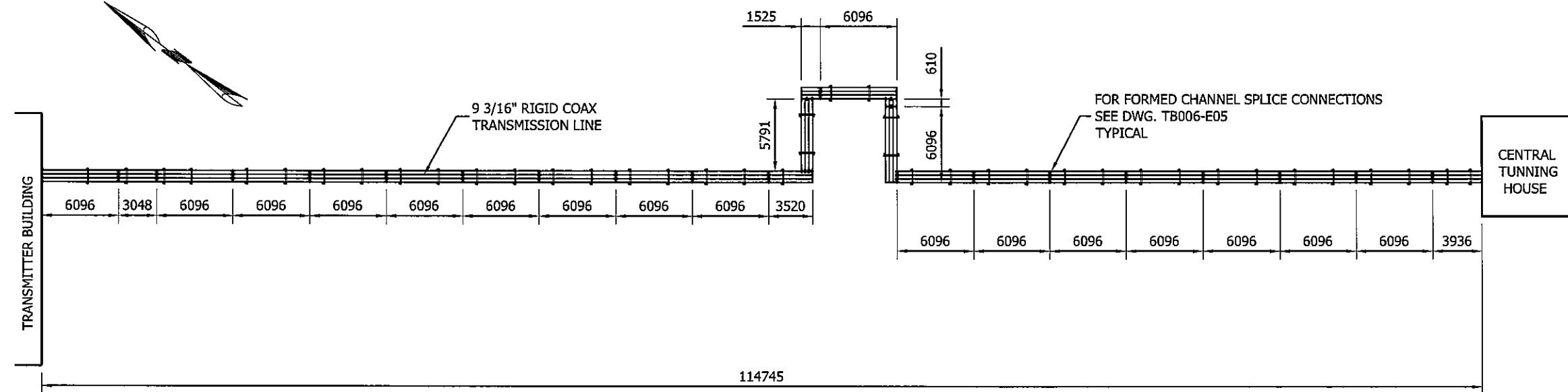
BRIDGES BETWEEN TOWERS

KUWAIT

DWN:	CHK'D:	DATE:
BBB	BBB	Nov/14/2007

ENGR:	ENGR APP'D:
E.V	

DRAWING NO:	REV:
83-LMLR-E03-03	0



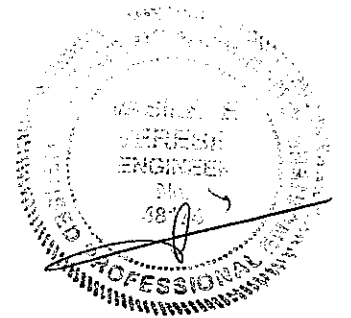
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DEC 6 3 2007



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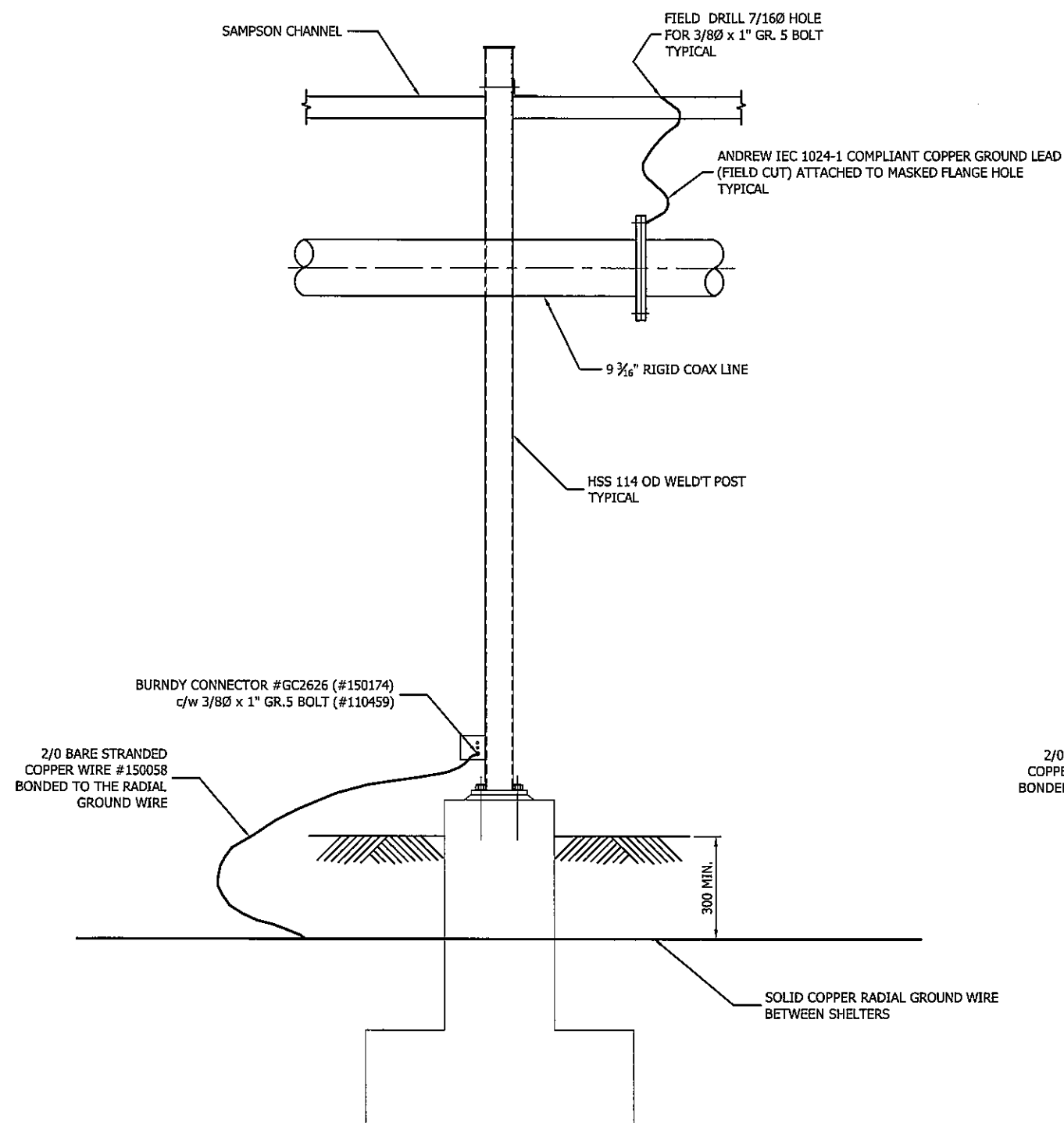
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IBB INT'L. BROADCASTING BUREAU
TX BRIDGE
SAMSON CHANNELS PLAN
KUWAIT

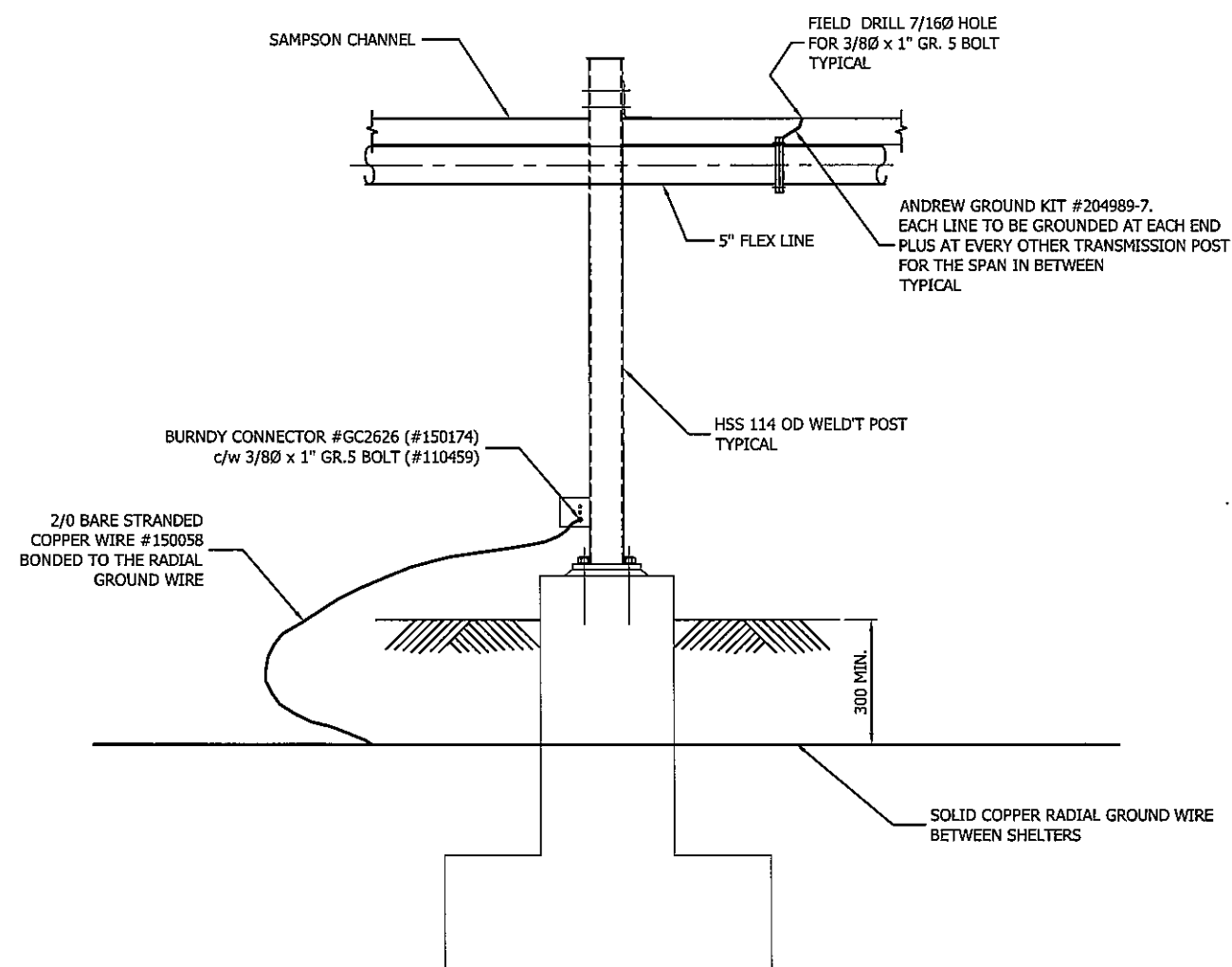
DWN:	CHK'D:	DATE:
BBB	BBB	Nov/05/2007

ENG'R:	E.V	ENG'R APP'D:
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DRAWING NO:	REV:
83-LMLR-E04-01	0



GROUNDING
TX BRIDGE TRANSMITTER BUILDING TO TUNNING BUILDING



GROUNDING
TX BRIDGE BUILDING TOWER 1 TO BUILDING TOWER 2
AND BUILDING TOWER 1 TO BUILDING TOWER 3

FILE NO.

0170741

REVISIONS

REV.	DESCRIPTION	DWN	CHK	APP
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IBB INT'L. BROADCASTING BUREAU
GROUNDING

KUWAIT

DWN:	CHK'D:	DATE:
BBB	BBB	Nov/14/2007

ENG'R:	ENG'R APP'D:
EV	

DRAWING NO:	REV:
83-LMLR-E05-01	0



1. CONCRETE IS TO HAVE A MINIMUM COMPRESSIVE STRENGTH OF 35 MPa (5000psi) AT 28 DAYS.
2. REINFORCED CONCRETE CONSTRUCTION SHALL BE IN ACCORDANCE WITH ACI 318.
3. THE MINIMUM CONCRETE COVER OVER REBAR SHALL BE 75mm (3").
4. POUR CONCRETE ON UNDISTURBED SOIL.
5. BACKFILL SHALL BE SELECTED MATERIAL, WELL COMPACTED IN LAYERS NOT EXCEEDING 300mm (12").
6. BACKFILL SHALL BE PLACED SO AS TO PREVENT THE ACCUMULATION OF WATER AROUND THE INSTALLATION.
7. CONCRETE REINFORCING STEEL SHALL BE IN ACCORDANCE WITH ASTM A615.
8. REINFORCING STEEL SHALL BE GRADE 400 MPa, UNLESS NOTED OTHERWISE.
9. EMBEDDED STRUCTURAL ANCHOR STEEL WILL BE SUPPLIED BY RADIAN.
ALL OTHER STEEL IS TO BE SUPPLIED BY THE FOUNDATION CONTRACTOR.
10. ALLOWABLE BEARING CAPACITY = 0.8 KG/cm^2 .
11. USE CEMENT TYPE V- AS RECOMMENDED IN THE GEOTECHNICAL REPORT FROM JUNE 13, 2007; REF. INCO/P/MP/RPT/024-07.
12. PAINT WITH 3 LAYERS OF BITUMINOUS MATERIAL.
13. DESIGN BASED ON THE MOST SEVERE CONDITIONS FROM THE GEOTECHNICAL REPORT FROM JUNE 13, 2007; REF. INCO/P/MP/RPT/024-07.

Tx LINE BRIDGE FOUNDATION - PLAN



Est Concrete Volume = 1.26 cu m

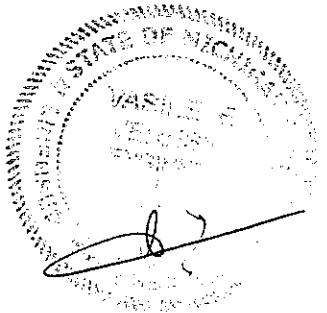
FILE NO.

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REVISIONS

REV.	DESCRIPTION	DWN	CHK	APP
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83-LMRL-E01-02



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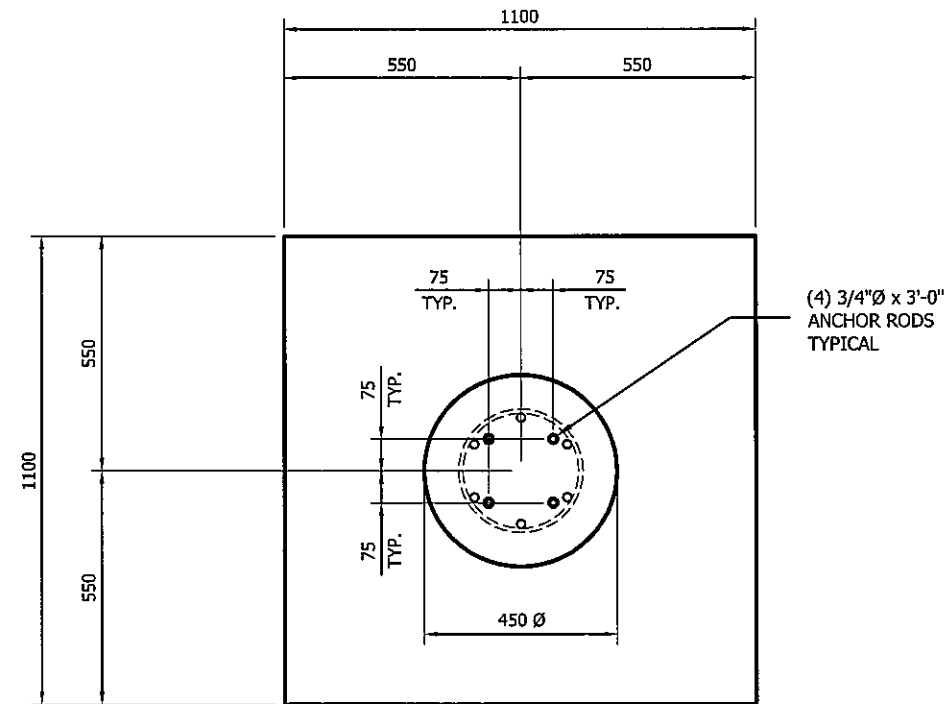
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IBB INT'L. BROADCASTING BUREAU
TX BRIDGE FOUNDATION
FROM TRANSMIT.TO CENTRAL BUILD.
KUWAIT

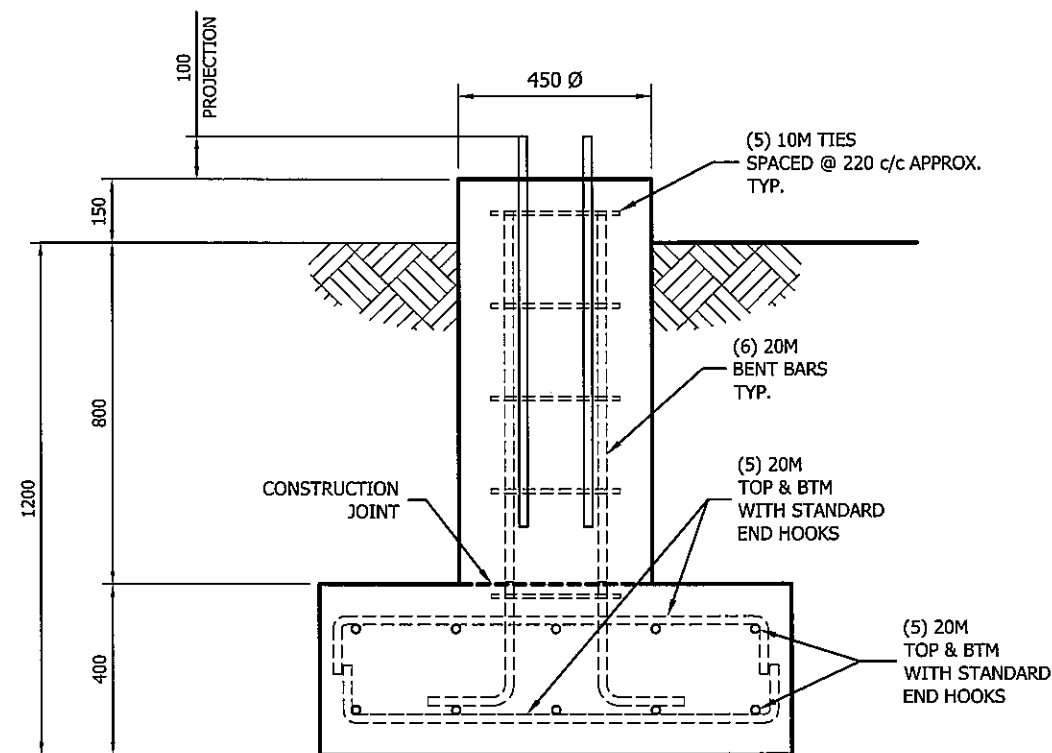
DWN:	CHK'D:	DATE:
M.G	BBB	Oct/22/2007

ENG'R:	ENG'R APP'D:
E.V	

DRAWING NO:	REV:
83-LMLR-F01-01	0



Tx LINE BRIDGE FOUNDATION - PLAN



Tx LINE BRIDGE FOUNDATION - ELEVATION

Est Concrete Volume = 0.63 cu m

NOTES:

1. CONCRETE IS TO HAVE A MINIMUM COMPRESSIVE STRENGTH OF 35 MPa (5000 psi) AT 28 DAYS.
2. REINFORCED CONCRETE CONSTRUCTION SHALL BE IN ACCORDANCE WITH ACI 318.
3. THE MINIMUM CONCRETE COVER OVER REBAR SHALL BE 75mm (3").
4. POUR CONCRETE ON UNDISTURBED SOIL.
5. BACKFILL SHALL BE SELECTED MATERIAL, WELL COMPACTED IN LAYERS NOT EXCEEDING 300mm (12").
6. BACKFILL SHALL BE PLACED SO AS TO PREVENT THE ACCUMULATION OF WATER AROUND THE INSTALLATION.
7. CONCRETE REINFORCING STEEL SHALL BE IN ACCORDANCE WITH ASTM A615.
8. REINFORCING STEEL SHALL BE GRADE 400 MPa, UNLESS NOTED OTHERWISE.
9. EMBEDDED STRUCTURAL ANCHOR STEEL WILL BE SUPPLIED BY RADIAN. ALL OTHER STEEL IS TO BE SUPPLIED BY THE FOUNDATION CONTRACTOR.
10. ALLOWABLE BEARING CAPACITY = 0.8 KG/cm^2 .
11. USE CEMENT TYPE V- AS RECOMMENDED IN THE GEOTECHNICAL REPORT FROM JUNE 13, 2007; REF. INCO/P/MP/RPT/024-07.
12. PAINT WITH 3 LAYERS OF BITUMINOUS MATERIAL.
13. DESIGN BASED ON THE MOST SEVERE CONDITIONS FROM THE GEOTECHNICAL REPORT FROM JUNE 13, 2007; REF. INCO/P/MP/RPT/024-07.

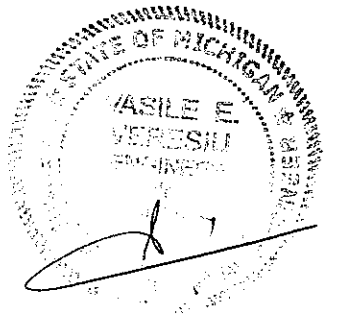
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0170741

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REV.	DESCRIPTION	DWN	CHK	APP

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IBB INT'L. BROADCASTING BUREAU
TX BRIDGE FOUNDATION
FOR POSTS FROM BUILD.1 & 3
KUWAIT

DWN: M.G	CHK'D: BBB	DATE: Oct/22/2007
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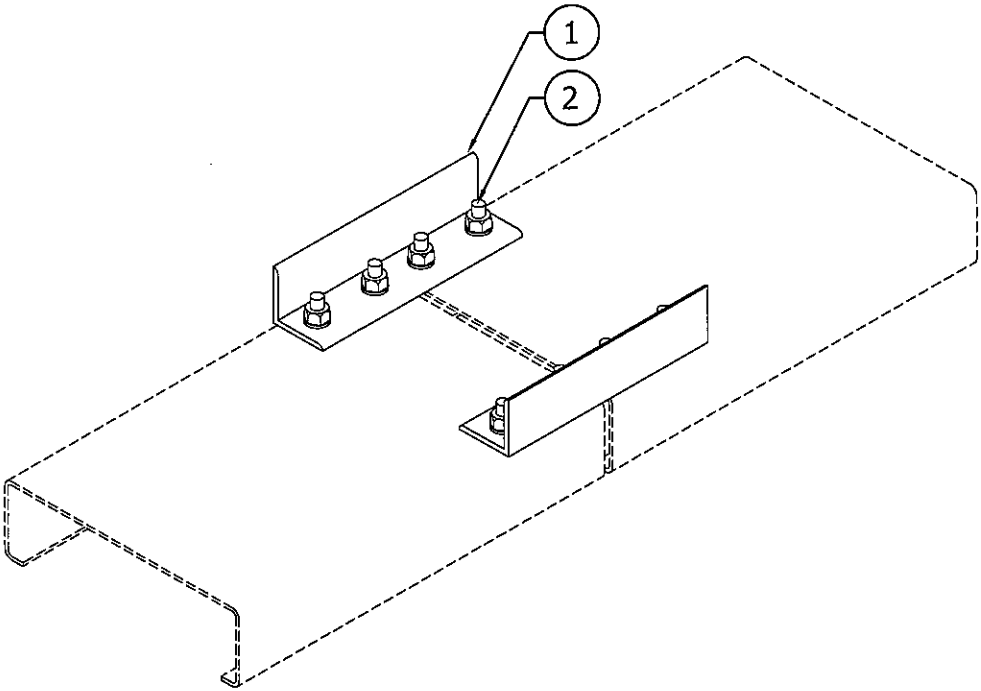
ENGR: E.V	ENGR APP'D:
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DRAWING NO: 83-LMLR-F02-01	REV: 0
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Dec/10/2002 3:23:45 PM

Version A

BILL OF MATERIAL KIT #STB006-F			
ITEM	QTY.	PART NO.	DESCRIPTION
1	2	91170D	L 2 1/2x2 1/2x1/4" (64x64x6mm)
2	8	110818	1/2"Ø x1 1/4"A325 BOLT ASS'Y



FILE NO.				
0170741				
REVISIONS				
REV.	DESCRIPTION	DWN	CHK	APP
DEC 03 2007				
DWG REFERENCE				
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IBB INT'L. BROADCASTING BUREAU SPICE CONNECTION WAVEGUIDE BRIDGE ACCESSORIES KUWAIT				
DWN:		CHK'D:		DATE:
HHR		JMC		Jul/05/2000
ENGR:		ENGR APP'D:		
RKA				
DRAWING NO:				REV:
TB006-E05				0



INSTALLATION DETAILS FOR CATALOG # 901-042-17

Minimum Vertical Distance to First Vertical Spring Hanger Above Horizontal Run						
Horizontal Run	45'	60'	75'	90'	105'	120'
Minimum Vertical Rise	23'	27'	30'	31'	32'	33'

Install the first vertical spring hanger the recommended distance above the base elbow so the first section of line can move as the horizontal run expands and contracts. Lateral braces are used to control side-to-side movement.

Horizontal suspension spring hangers absorb the movement induced by the expansion and contraction of the vertical run. Seasonal and daily temperature changes will cause several inches of movement relative to the tower due to the differences in thermal coefficient of expansion of the steel tower and the copper transmission line. The temperature of the transmission line under operation will be different than the ambient and tower temperature.

All vertical spring hangers should have the spring tension set to accommodate the local mean temperature. The hanger spring tension charts, supplied for temperature changes, are to be used as a guide. Free movement is essential and should be verified by tracking expansion and contraction through a daily cycle.

RECOMMENDED BOLT TORQUE

Size	Recommended Torque											
	Grade 5		Grade 8		Stainless Steel		Bronze		Brass			
	Coarse	Fine	Coarse	Fine	Coarse	Fine	Coarse	Fine	Coarse	Fine		
#4					5.2		4.8		4.3			
#6					9.6		8.9		7.9			
#8					19.8		18.4		16.2			
#10					22.8	31.7	21.2	29.3	18.6	25.9		
1/4	8	10	12	14	6.3	7.8	5.7	7.3	5.1	6.4		
5/16	17	19	24	27	11	11.8	10.3	10.9	8.9	9.7		
3/8	31	35	44	49	20	22	18	20	16	18		
7/16	49	55	70	78	31	33	29	31	26	27		
1/2	75	85	105	120	43	45	40	42	35	37		
9/16	110	120	155	170	57	63	53	58	47	51		
5/8	150	170	284	323	93	104	86	96	76	85		
3/4	270	295	510	568	128	124	104	102	118	115		
7/8	395	435	813	902	194	193	178	178	159	158		
1	590	660	905	1030	287	289	265	240	235	212		

Note: Sizes from #4 through #10 are in-lbs
 Sizes from 1/4" through 1" are ft-lbs

RADIAN COMMUNICATION SERVICES

Materials List

Ship To: 761029 Kuwait
Project Number: 0620102 Kuwait
Customer : 760843 IBB International Broadcasting

11/19/07 9:13:15
R55MATLIS RCS0002
BBRZOZOWAS

Ref.	Order	Line Num	Item Number	Quantity	U/M	Description	Drawing Number	Weight (LBS)	Weight (KGS)	ST
EMBEDDED MATERIAL										
B03 TX BRIDGE FOUNDATION MATERIAL										
Ref.	Order	Line Num	Item Number	Quantity	U/M	Description	Drawing Number	Weight (LBS)	Weight (KGS)	ST
1	79591	60.0000	KCFNDTXBR	116	PC	Tx Bridge Foundation for (1) pier				REL
Line Number	Part Number	Qty	U/M	Description	Additional Descripton	Drawing Number	Weight (LBS)	Weight (KGS)	ST	
60.0100	110242	454	PC	Thd Rod 3/4 X 3' Galv is	A307 (GRADE 2)		1,712.16	776.62	REL	
60.0200	110148	1044	EA	HEX NUT 3/4 (10 UNC) 2H GALV			52.20	23.68	REL	
60.0300	110208	580	PC	Hardened Washer 3/4 (F436)	Galv		46.40	21.05	REL	
							1,810.76	821.35		

ACCESSORIES

K11 MAIN TX LINE BRIDGE

Ref.	Order	Line Num	Item Number	Quantity	U/M	Description	Drawing Number	Weight (LBS)	Weight (KGS)	ST
2	79591	2.0000	91166K2	8	PC	HSS114 O.D Weld't X 5485 (renumbered from 91166K1)	91B166-M01	1,464.00	664.06	REL
3	79591	4.0000	91166H2	46	PC	HSS114 O.D Weld't X 3960 (renumbered from 91166H1)	91B166-M01	6,348.00	2,879.40	REL
4	79591	6.0000	91166C2	28	PC	HSS114 O.D Weld't X 2450 (renumbered from 91166C1)	91B166-M01	2,604.00	1,181.15	REL
5	79591	7.0000	91166A2	34	PC	HSS114 O.D Weld't X 1830 (renumbered from 91166A1)	91B166-M01	2,550.00	1,156.66	REL
6	79591	8.0000	91171A	78	PC	Formed Channel 305 X 4 X 6096	91B171-M01	17,940.00	8,137.45	REL
7	79591	10.0000	91171B	15	PC	Formed Channel 305 X 4 X 3048	91B171-M01	1,725.00	782.45	REL
8	79591	12.0000	TB010B1	44	PC	L 102x76x6x1248 (300W)	TB010-M01	1,056.00	478.99	REL
9	79591	26.0000	110260	86	PC	U-Bt Assy 1/2x5-1/16 in C/C Ga	91B017-M03	75.68	34.33	REL
10	79591	28.0000	111041	260	PC	J-Bolt Assy 1/2-13 X 5 in Squa Galvanized	91B334_M02	104.00	47.17	REL
11	79591	30.0000	LMLR2A	6	EA	BAR 102x10x223 (300W)	83-LMLR-M02-01	24.00	10.89	REL
12	79591	32.0000	110260	12	PC	U-Bt Assy 1/2x5-1/16 in C/C Ga	91B017-M03	10.56	4.79	REL
13	79591	34.0000	LMLR1A	36	EA	C250x30x1348 (300W)	83-LMLR-M01-01	3,276.00	1,485.97	REL
14	79591	36.0000	LMLR1B	76	EA	L152x152x10x280 WELD'T	83-LMLR-M01-01	1,216.00	551.57	REL
15	79591	38.0000	110260	152	PC	U-Bt Assy 1/2x5-1/16 in C/C Ga	91B017-M03	133.76	60.67	REL

RADIAN COMMUNICATION SERVICES

Materials List

11/19/07 9:13:15

R55MATLIS RCS0002

BBRZOZOWAS

Ship To: 761029 Kuwait
Project Number: 0620102 Kuwait
Customer : 760843 IBB International Broadcasting

Ref.	Order	Line Num	Item Number	Quantity	U/M	Description	Drawing Number	Weight (LBS)	Weight (KGS)	
16	79591	40.0000	110003	320	PC	Bolt Assy 1/2x1-3/4 in A325 Ga		73.60	33.38	REL
17	79591	42.0000	TX001A	34	PC	L 152X102X10X513 (300W)	TX001_M01	748.00	339.29	REL
18	79591	44.0000	110260	68	PC	U-Bt Assy 1/2x5-1/16 in C/C Ga	91B017-M03	59.84	27.14	REL
19	79591	46.0000	111041	68	PC	J-Bolt Assy 1/2-13 X 5 in Squa Galvanized	91B334_M02	27.20	12.34	REL
20	79591	48.0000	STB006-F	90	KI	Tx-BR Splice Connection Kit Dwg# TB006_E05	TB006_E05			REL
Line Number	Part Number	Qty	U/M	Description	Additional Description	Drawing Number	Weight (LBS)	Weight (KGS)	ST	
48.0100	91170D	180	PC	L 64 X 64 X 6 X 280 (300W)	(renumbered from 5363-4)	91B170_M01	655.20	297.19	REL	
48.0200	110001	720	PC	Bolt Assy 1/2x1-1/4 in A325 Ga	[M12x32]		144.00	65.32	REL	
48.0300	110203	720	EA	LOCK WASHER 1/2 (SPRING) GALV			13.68	6.21	REL	
							812.88	368.72		
21	79591	50.0000	LMLR3A	2	EA	BAR 152x6x574 (300W) BENT	83-LMLR-M03-01	18.00	8.16	REL
22	79591	54.0000	LMLR2B	2	EA	C250x30x1348 (300W)	83-LMLR-M02-01	182.00	82.55	REL
23	79591	56.0000	110003	10	PC	Bolt Assy 1/2x1-3/4 in A325 Ga		2.30	1.04	REL
24	79591	58.0000	110399	10	PC	Bevel Washer 1/2 (Mall.) Galv		.79	.36	REL
25	79591	64.0000	190167	5	PC	HILTI ANCHOR HSL M12/50				REL
26	79810	2.0000	110399	170	PC	Bevel Washer 1/2 (Mall.) Galv		13.36	6.06	REL
27	79810	4.0000	110004	10	PC	Bolt Assy 1/2 X 2 in A325 Galv		2.40	1.09	REL
28	79810	16.0000	111041	6	PC	J-Bolt Assy 1/2-13 X 5 in Squa Galvanized	91B334_M02	2.40	1.09	REL

K16 GROUNDING MATERIAL ABOVE GRADE

Ref.	Order	Line Num	Item Number	Quantity	U/M	Description	Drawing Number	Weight (LBS)	Weight (KGS)	ST
29	79810	6.0000	150058	225	MT	Grd Wire 2/0 Bare Str Copper (19 strand)		303.75	137.78	REL
30	79810	12.0000	150174	80	PC	Grd. Connector-2 Cables To Bar 4 Sol.-2/0 Str.				REL
31	79810	14.0000	110459	130	PC	Bolt Assy 3/8 X 1 in Gr5 Galv		5.20	2.36	REL

Total Weight

42,589.48 19,318.26

RADIAN COMMUNICATION SERVICES

11/19/07 9:13:15

Materials List

Ship To: 761029 Kuwait

Project Number: 0620102 Kuwait

Customer : 760843 IBB International Broadcasting

R55MATLIS RCS0002

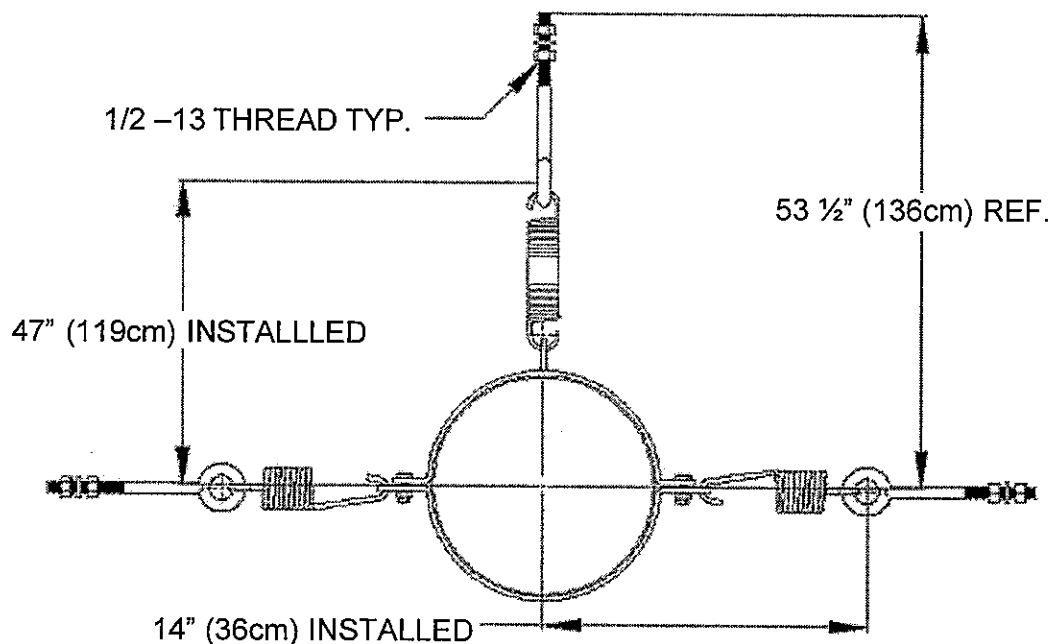
BBRZOWAS

<u>Ref.</u>	<u>Order</u>	<u>Line</u> <u>Num</u>	<u>Item Number</u>	<u>Quantity</u>	<u>U/M</u>	<u>Description</u>	<u>Drawing Number</u>	<u>Weight</u> <u>(LBS)</u>	<u>Weight</u> <u>(KGS)</u>
-------------	--------------	---------------------------	--------------------	-----------------	------------	--------------------	-----------------------	-------------------------------	-------------------------------

END OF MATERIALS LIST REPORT



INSTALLATION DETAILS FOR CATALOG # 901-042-17



Planning and Installation Requirements

The tables below must be used to accommodate the differential of expansion and contraction between a broadcast tower and the transmission line. A minimum horizontal run length is required to minimize the stress on the elbow at the base of the tower. The distance between the tower base and the transmitter building should be planned to accommodate the largest horizontal run requirement for the tower height and the largest transmission line size and type to be installed. The minimum distance to the first vertical hanger is required to permit expansion and contraction of the horizontal run to minimize the stress on the elbow at the base of the tower.

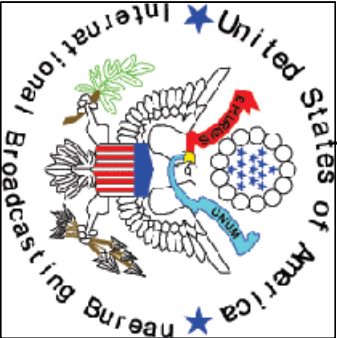
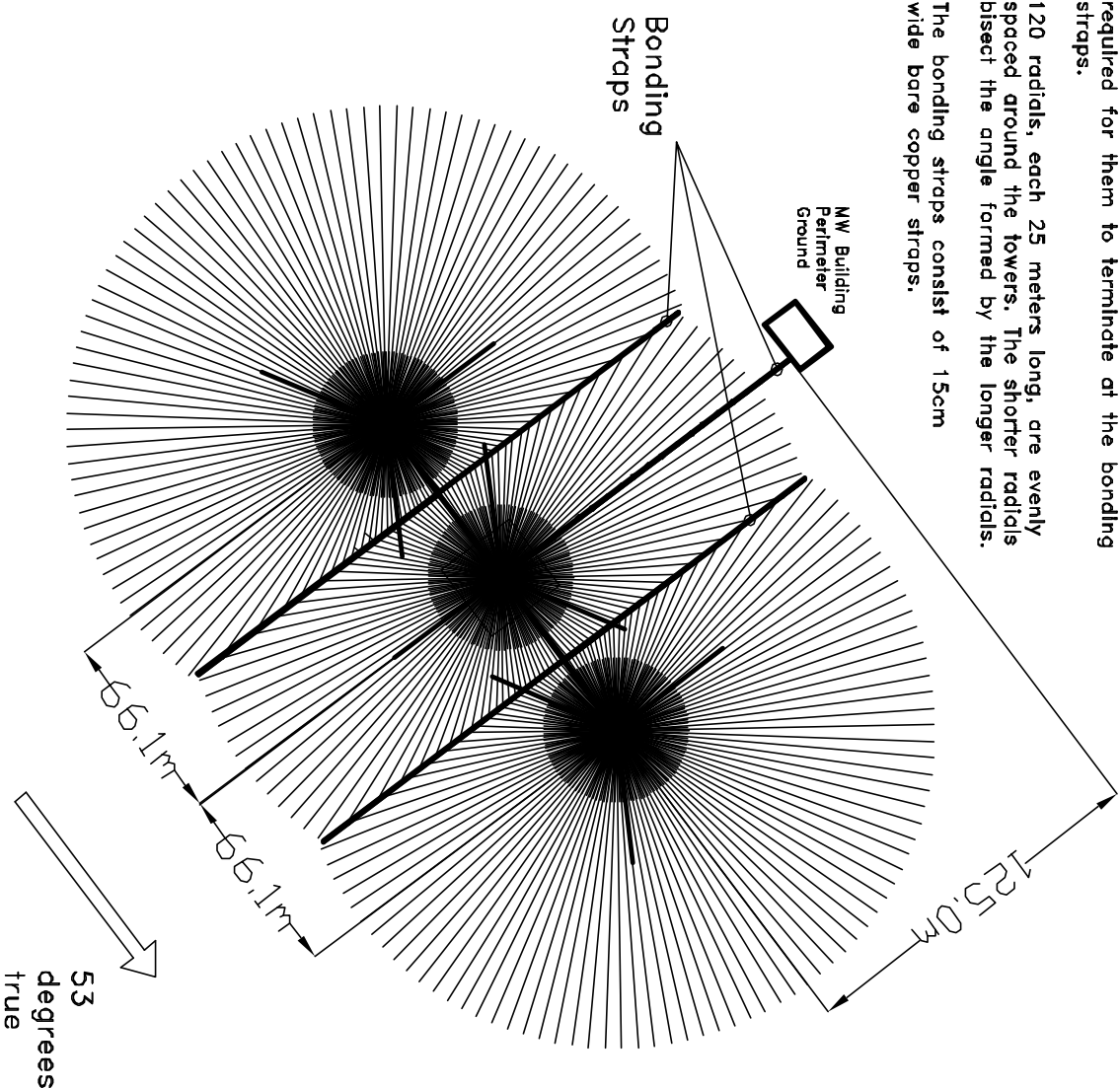
Minimum Horizontal Run Length vs. Vertical Run Length	
Vertical Run	Minimum Horizontal Run
250'	45'
500'	60'
750'	75'
1000'	90'
1500'	105'
2000'	120'

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED

All Radials are 4mm or larger solid copper.
 120 radials, evenly spaced around the towers, are either 110 meters long or as long as required for them to terminate at the bonding straps.

120 radials, each 25 meters long, are evenly spaced around the towers. The shorter radials bisect the angle formed by the longer radials.

The bonding straps consist of 15cm wide bare copper straps.



1386 kHz, 600kW, Kuwait				
Antenna Plot and Ground System				
SIZE	FSCM NO.	DWG NO.	REV	
A		AT-802	0	
SCALE	N/A	DATE: February 21, 2007	SHEET	1 of 1

IBB Kuwait – Transmission Line support and Transmission Line Installation – Skills and Tools

Transmission line support installation:

Skills:

Reading and interpretation of technical drawings
Knowledge of local construction codes
Knowledge of local safety and work regulations
Fully versed in site layout and surveying techniques
Knowledgeable in excavation techniques
Concrete forming
Reinforcing steel tying and placement
Template fabrication and utilization for anchor bolts
Concrete pouring and aeration techniques
Taking of concrete samples
Form removal
Backfilling techniques
Steel post setting and leveling
Steel support bridge assembly
Post grounding
Field cutting, drilling and corrosion protection
Leveling and adjustment of posts and Bridge
Proper bolt torque techniques

Equipment:

Transit and surveying equipment
Excavation equipment
Carpentry tools for forming
Aeration equipment for concrete
Re-bar tying tools
Levels
Tape measures
Hand tools
Torque wrench with appropriate sockets
Drill with bits
Cut off saw with blades
Markers

Rope
Slings
Grounding tools including equipment to braze and silver solder
Hand jack or suitable tension assist devices

RF Transmission line installation and testing:

Skills:

(Supervision with appropriate expertise will be provided by the Government)

Experience and knowledge in the handling of RF rigid transmission line components
Experience and knowledge in the handling of RF semi flexible transmission line components
Experience in mating rigid line sections
Inner anchor seating techniques
“O” ring installation techniques including lubrication and setting
Flange bolt sequencing and torque
Spring hanger set up procedures
Rigid hanger set up procedures
Sliding hanger set up procedures
Roller hanger set up procedures
System leveling and adjustment
Handling and management of large cable reels
Semi-flexible hanger installation
Transmission line grounding techniques
Weatherproofing of ground kits
Semi-flexible connector installation techniques
Understanding of RF transmission line pressurization techniques
Installation of dehydration equipment
Verification of gas integrity of RF lines
Leak detection and remedy techniques
RF testing of transmission lines
Hy-pot testing of transmission lines

Tools (in addition to those listed above):

Reel stands to support semi-flexible lines
Small winch or pull equipment to remove lines from reels
Connector installation tools (Fine hack saw, fine files, metal snips, small non metallic hammer, sharp knives, Allen wrenches, connector wrenches)
Ground kit installation tools (Sharp knife, cleaning solvent, screwdriver)
Leak detector

RF sweep gear (contractor is not required to supply this)
Hy-Pot tester (contractor is not required to supply this)

Toroid Corporation of Maryland

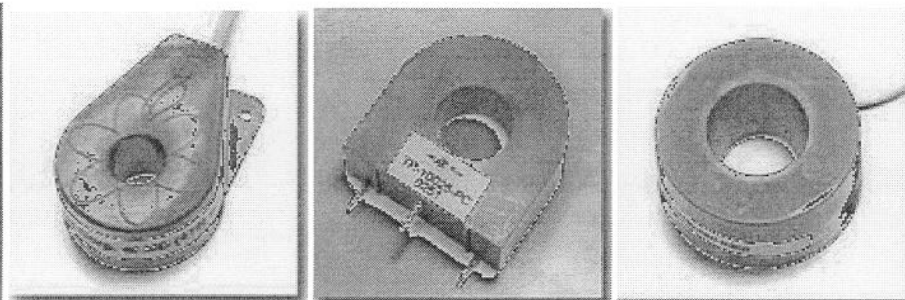
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AC Current Sensing Transformers Line Frequency 50-400 Hz, Standard Design

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Toroid Corporation offers two low cost standard design current transformers. Both are used in applications where you want to detect or measure AC-currents with no need for tight tolerances. Typical applications include power limiting controllers for air conditioning equipment, electrical heating systems, electrical furnaces, and motor drives.

The Current Transformers are designed using a core of tape wound, grain-oriented, silicon steel.

- The -S versions are encased in a sturdy plastic housing and have mounting ears and 15" leads.
- The -PC versions are potted into plastic housings and are PC mountable.
- The TR12525 versions are potted into sturdy plastic housings and come with 15" leads.

ELECTRICAL PARAMETERS

The primary current corresponding to maximum secondary output signal can be varied by changing the secondary load resistance.

Order	15" Leads	PC Mount	Turns	Current range	Max Sec Voltage
	TR 3025-S	TR-3025-PC	1:300	0-90 A	4.5 V
	TR 5025-S	TR-5025-PC	1:500	0-90 A	8.0 V
	TR 10025-S	TR-10025-PC	1:1000	0-90 A	16 V
	TR 20025-S	TR-20025-PC	1:2000	0-90 A	32 V
	TR 30025-S	TR-30025-PC	1:3000	0-90 A	48 V
	TR 12525	N/A	1:1250	0-375 A	45 V

Toroid's Products:

Standard Designs

- [ISOBOX Transformers /Medical Isolation](#)
- [Toroidal Isolation Transformers](#)
- [Rectifier Transformers:](#)
[For 117V/60Hz](#)
[W/ Dual Primaries](#)
[Multi-Voltage](#)
[For Tube Amplifiers](#)
[For Solid State Amplifiers](#)
- [Balanced Transformers](#)
- [Auto-Transformers](#)
- [Current Sensing Transformers](#)
- [Standard Lamp Transformers](#)
- [Transformer Kits Datasheet](#)

Custom Designs

- [Industrial Control Transformers](#)
- [DC Filter Chokes](#)
400Hz Transformers
3-Phase Transformers
Inverter Transformers for 50/60 Hz

High Frequency Magnetics

OPTIONS

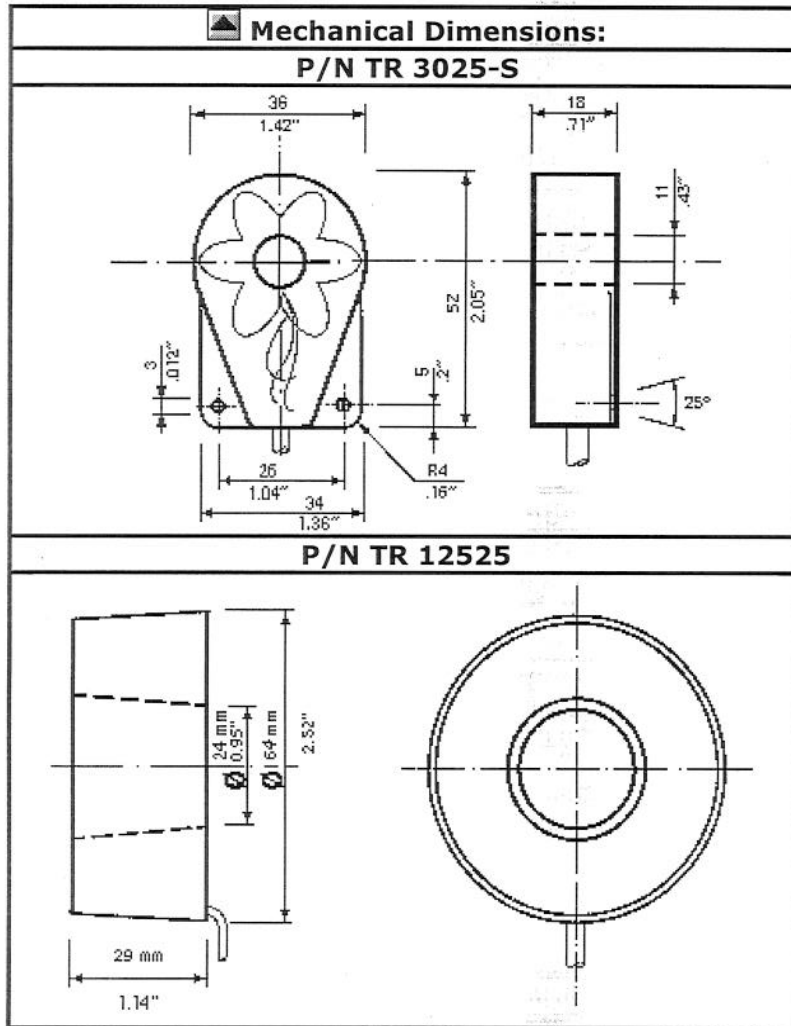
The above designs are also available without encapsulation and multi-stranded leads. Please call our Customer Service Department for prices and availability. Other secondary turns and sizes are available upon request.

HIGH FREQUENCY CURRENT TRANSFORMERS

Please refer to our sister company, Inductive Technologies, at <http://www.inductech.com/> or call 1-800-961-6295.

CUSTOM DESIGN

We offer complete custom design capability and can also build to print. We make transformers up to 23" (575mm) diameter.



Prices (F.O.B Factory, Salisbury, MD)				
Order	Part No.	1-9	10-24	25-99
<input type="button" value="Buy"/>	TR 3025-S	\$15.54 ea.	\$13.26 ea.	\$12.12 ea.
<input type="button" value="Buy"/>	TR 12525	\$23.33 ea.	\$22.20 ea.	\$20.88 ea.
For larger quantity prices, please contact our factory sales department				

Prices and data subject to change without prior notice.

- Delivery: Small quantities are normally available from stock
- 30-Day Return Policy of Undamaged Items - 15% Restocking Fee

- 36 Month Product Warranty
- Terms and Conditions

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